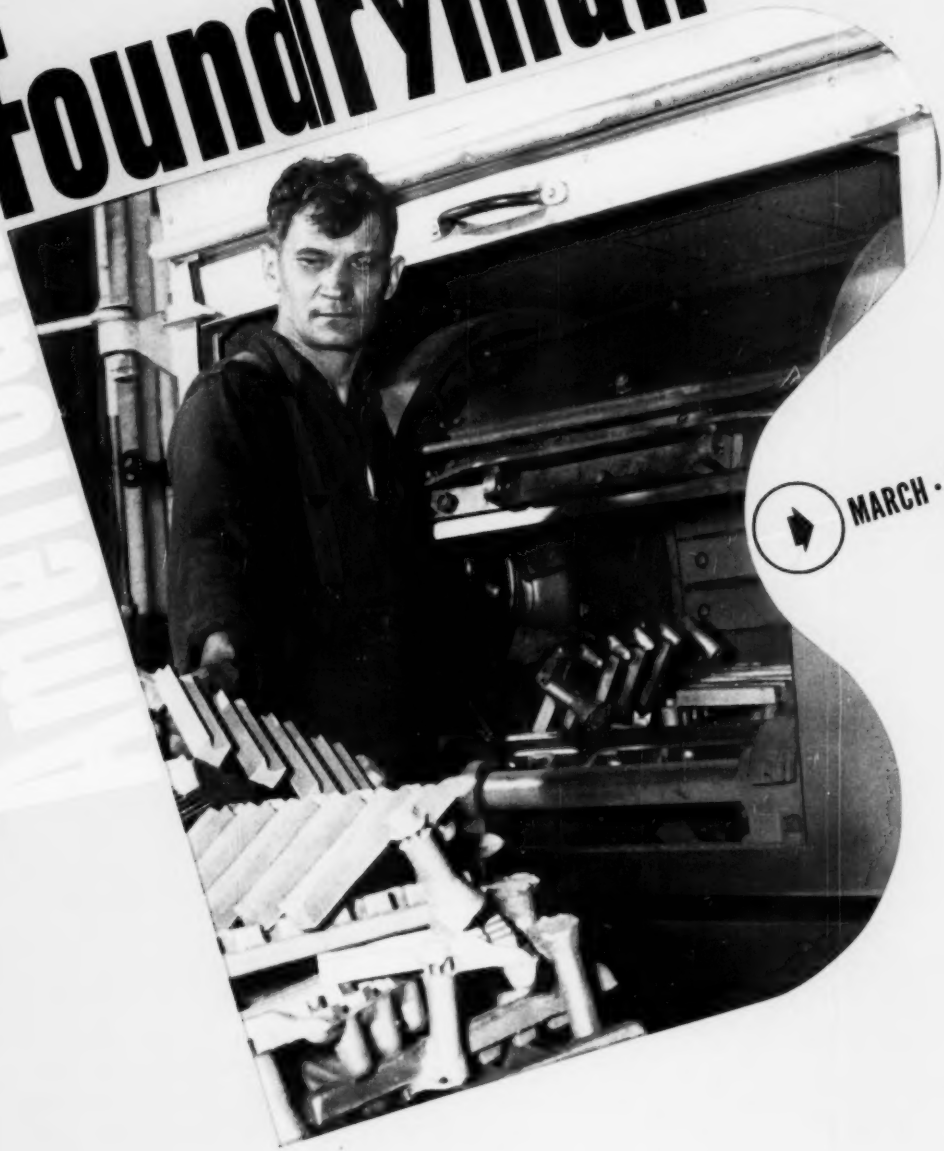
The Foundrymen's Magazine

American Foundryman



MARCH · 1950

Lectromelt
RAISED THE ROOF
and electric arc melting COSTS CAME DOWN

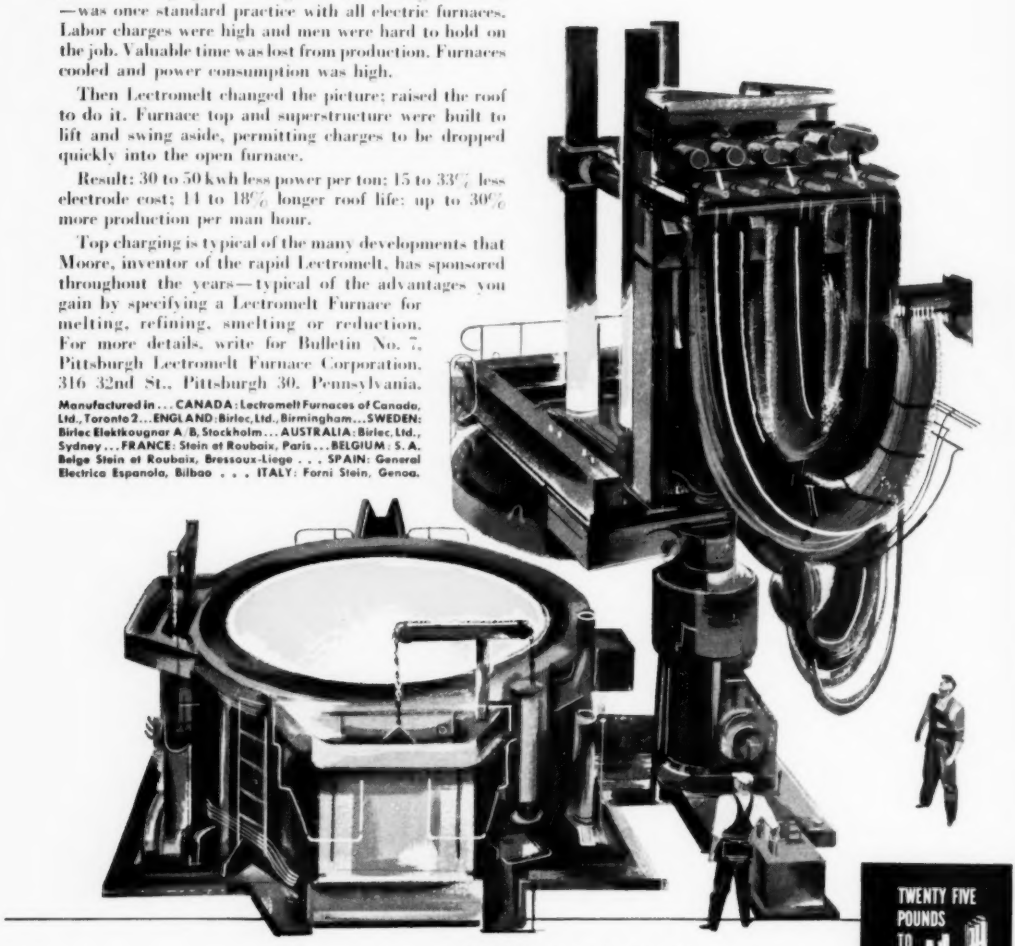
Machine charging—shoveling materials through the door—was once standard practice with all electric furnaces. Labor charges were high and men were hard to hold on the job. Valuable time was lost from production. Furnaces cooled and power consumption was high.

Then Lectromelt changed the picture; raised the roof to do it. Furnace top and superstructure were built to lift and swing aside, permitting charges to be dropped quickly into the open furnace.

Result: 30 to 50 kwh less power per ton; 15 to 33% less electrode cost; 14 to 18% longer roof life; up to 30% more production per man hour.

Top charging is typical of the many developments that Moore, inventor of the rapid Lectromelt, has sponsored throughout the years—typical of the advantages you gain by specifying a Lectromelt Furnace for melting, refining, smelting or reduction. For more details, write for Bulletin No. 7, Pittsburgh Lectromelt Furnace Corporation, 316 32nd St., Pittsburgh 30, Pennsylvania.

Manufactured in... CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2... ENGLAND: Birlec, Ltd., Birmingham... SWEDEN: Birlec Elektkougnar A B, Stockholm... AUSTRALIA: Birlec, Ltd., Sydney... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege... SPAIN: General Electrica Espanola, Bilbao... ITALY: Forni Stein, Genoa.



MOORE RAPID

WHEN YOU MELT... Lectromelt

The 1st bag, or the 1,000th bag.

FEDERAL GREEN BOND

shows no variation in fine, dependable, uniform quality.

SEE YOU AT THE SHOW
Booths 1112 and 1116

BEST OF THE BENTONITES

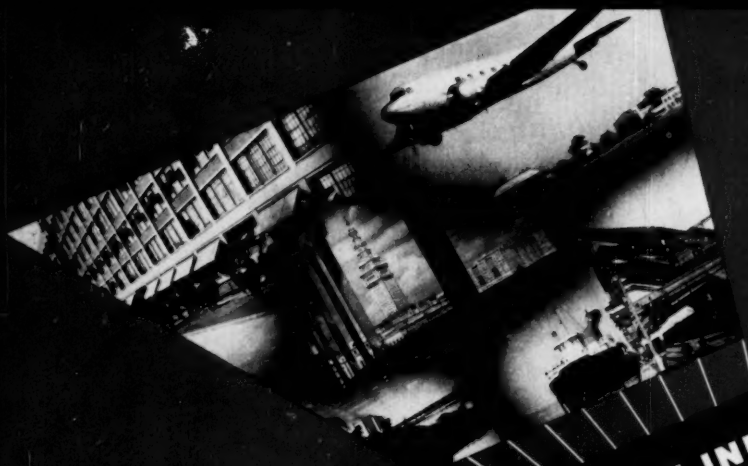
THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant — Mines

CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • UPTON, WYO.

Wisner and Company, Commerce Station Box 71, Minneapolis 15, Minn. • Beaumont Cement Sales Co., Houston and Beaumont, Texas, and Harvey, La.
Pacific Graphite Co., Inc., 40th & Linden, Oakland 8, and 6025 District Blvd., Los Angeles, Calif. • Pacific Graphite Works, Oakland, Calif. • LaGrand Industrial Supply Co., Portland, Ore.
CANADA—Overseas Commodities Ltd., 2845 Grandview Hgy., Vancouver, B. C. • T. D. Barnes, 59 Sun Life Bldg., Hamilton, Ont. • Newman Foundry Supply Ltd., 1227 Osborne St., Montreal 3, Que.
European Concessionaires: The District Chemical Company, Ltd., 1-19 New Oxford St., London W. C. 1, England



YOUR BUSINESS WILL BE INFLUENCED HERE

May 8-12

• CLEVELAND

54th

A.F.S. FOUNDRY CONGRESS AND SHOW

All those interested in the development and manufacture of cast metals will watch events at Cleveland, when the industry meets at the A.F.S. Foundry Congress and Show, May 8-12. The newest methods, the newest equipment, will be presented to an industry at that time . . . under one roof . . . in harmony with the atmosphere that characterizes every A.F.S. Convention — **united progress through cooperative effort.**

It is the correct combination of events that make for a successful Congress . . . for the thousands of A.F.S. members and guests who will attend the technical events, the exhibits, and participate in the many social activities . . . for the firms with the foresight to join in this industry-wide gathering, the major foundry event of 1950.

Headquarters for the Meeting — Cleveland Public Auditorium — will be self-contained for an event of the scope of the 54th Foundry Congress and Show . . . a first class restaurant . . . attractive lounges . . . ample telephone facilities . . . suitable meeting rooms for the extensive technical program . . . ideal exhibit halls.

With hotel housing conditions back to normal, the 1950 A.F.S. Congress will attract the important influences from the foundry world, who will come to participate in events that will revolve around a Convention concentrated on **modernization and economy of production in the foundry.**

Cleveland Public Auditorium—May 8-12, Inclusive

AMERICAN FOUNDRYMEN'S SOCIETY

[illegible] W. Adams St., Chicago

MARCH, 1950

VOLUME XVII, NUMBER 3

March, 1950

American Foundryman

Official publication of American Foundrymen's Society

Removing microscope slide castings from steel grit blasting tumbler at the Bausch & Lomb foundry in Rochester, N. Y., where more than 1000 tons of finished castings are produced annually. The castings—gray iron, brass and bronze, and aluminum alloys—go into a wide range of scientific optical and opthalmic equipment.

Published monthly by the American Foundrymen's Society, Inc., 616 S. Michigan Ave., Chicago 5. Subscription price in the United States, Canada and Mexico, $5.00 per year; international, $6.00; single copies, 50c. Entered as second class matter July 22, 1938, under act of March 3, 1879, at the Post Office, Chicago, Ill. The American Foundrymen's Society is not responsible for statements or opinions advanced by authors of papers printed in its publication. AMERICAN FOUNDRYMAN is indexed regularly by Engineering Index, Inc.

Efficiency of . . .
Continuous BAND CUTTING
Now Extended to the CUTTING of ALL SOLID MATERIALS

New DoALL Band Machines and cutting tools for 1950 give up to 200% faster production cutting and up to 100% longer tool life in the trimming and cutting of ferrous and non-ferrous castings. Tough alloys that have defied economical cutting are now profitably sliced apart with ease on DoALL Band Machines and cutting tools.

Only DoALL gives you a range of sizes, kinds and operating speeds that are tailored to your specific needs.

Super Zephyr — High Speed and Friction Sawing Machine with 36" capacity — 21 models tailored to your needs in speed range.

Low-Cost Utility DoALLs — 5 models — various speeds — 16" capacity.

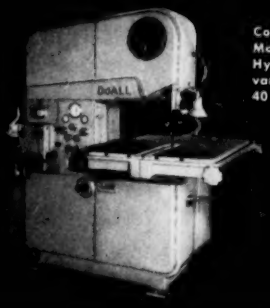
SEE DEMONSTRATIONS at FOUNDRY CONVENTION
Cleveland, May 8–12

These latest Foundry and Pattern Shop Machine Tools will be in operation cutting all kinds of castings, patterns, etc. demonstrating:

Friction Sawing **Contour Sawing**
Line Grinding **High Speed Sawing**

DoALL Exhibit No. 1200

Contour Machines—5 models — 16" to 60" capacity — variable speeds.



Contour-matic—the first Band Machine Tool with complete Hydraulic Operation and variable speed range from 40 to 10,000 F.P.M.

27 Kinds BAND CUTTING TOOLS

for

Line Milling
Line Grinding
Contour Sawing
Friction Sawing
Continuous Filing
Polishing
Honing

WRITE for literature and information
That will give you . . .
FREE DEMONSTRATIONS IN YOUR PLANT
No obligation, of course.

The DoALL Company
Des Plaines, Ill., U.S.A.
Cable Address DoALL Des Plaines
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Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Division, Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

High-Chromium, High-Carbon Iron

. . . the Iron That Hardens as it Wears

In many applications involving extreme abrasion, ordinary work-hardening alloys are not suitable. This is because most of these alloys require a definite pounding action for a martensite transformation, and the scouring action of an abrasive is not sufficient for development of high wear resistance. For this reason, high-chromium, high-carbon irons were developed – irons that wear-harden.

Chromium Content of Irons Ranges from 24 to 30 Per Cent

These irons are made in the electric furnace and have the following composition range:

Chromium	24 to 30 per cent
Carbon	2.25 to 2.85 per cent
Manganese	0.50 to 1.25 per cent
Silicon	0.50 to 1.50 per cent
Nickel	minimum
Iron	balance

Irons of this composition are readily castable by steel casting techniques.

Development of Greater Wear Resistance by Heat Treatment

Structurally, these irons consist of primary iron-chromium carbides in a matrix of iron-chromium solid solution and secondary iron-chromium carbides. They are hard in the as-cast condition (500 to 550 Brinell), but when they are given an austenitization heat treatment they develop much higher hardness (about 600 Brinell), and also have greatly improved wear resistance. Austenitization consists of heating these irons to a temperature of about 2012 deg. F. for an hour, then allowing them to cool in air. This heat-treatment promotes the formation of very unstable austenite–austenite that will transform to a harder martensitic end-product even under rubbing or mild impingement action. Austenitization has been found to be far more effective in increasing wear resistance than the promotion of unstable austenite by the addition of ferrite-forming alloying elements.

High-chromium, high-carbon irons can also be annealed to sufficiently low-hardness values for grinding or simple machining. Hardnesses as low as 350 to 450 Brinell can be obtained by heating the castings to temperatures of 1400 to 1450 deg. F. for 12 to 24 hours, then allowing them to cool in air.

Irons Have Wear Resistance Many Times That of Other Alloys

Austenitized high-chromium irons have been known to last as much as 21 times longer than other wear-resistant alloys in applications involving extreme frictional abrasion. These applications include sandblast nozzles and liners, pantograph contact shoes, grinding disks, pulleys, chute-liner plates, dredge-pump liners, and rollers for crushing various hard materials.

In a recent test, high-chromium iron was compared to special wear-resistant steel castings as the material for hammers in a machine that was used to crush abrasive material. The chrome-iron hammers were found to have almost 7 times the wear resistance of the steel castings.

When thoroughly backed up with zinc, the iron also has enough shock resistance to be used effectively as crushing hammers and jaw plates for many severe rock-handling jobs.

Fig. 1. After crushing the same amount of abrasive material in a hammer mill, the badly worn steel casting (left) had a weight loss of 37 per cent while the high-chromium iron casting (right) lost only 5.5 per cent.

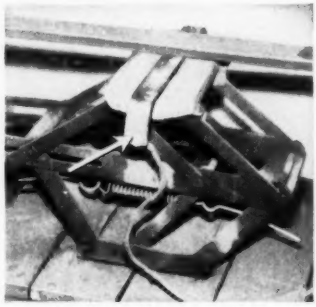


Fig. 2. This chrome-iron pantograph shoe had a service life of about 10 years. A tool steel that was used in similar service wore out in about 3 or 4 months; copper lasted about 24 hours.

Metallurgical Service Available

For years, ELECTROMET high-carbon ferrochrome has been used to make chromium additions to abrasion-resistant high-chromium irons. If you should have any questions about either the production or use of these irons, write to the nearest ELECTROMET office. Our metallurgists will be glad to give many valuable suggestions and recommendations on how to make or use this iron most effectively.

Write for a free copy of the ELECTROMET publication, "Abrasion-Resistant High-Chromium Iron." This booklet is a collection of some of the best available information on how to make and to use abrasion resistant iron castings most efficiently.

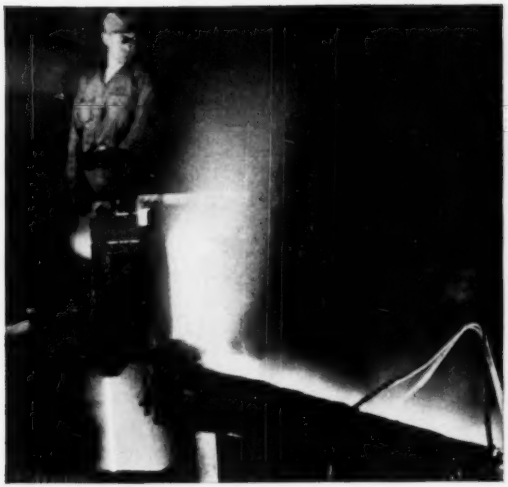
The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.

OBTAINING PROLONGED INCREASES IN FLUIDITY in melting Malleable Iron

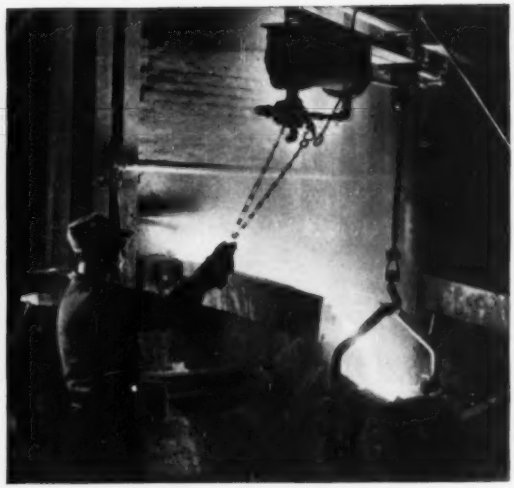
1 **FERROCARBO Briquettes** are processed and packaged to make their addition to cupola charge an easy operation.

FERROCARBO Briquettes are a specially processed metallurgical silicon carbide. When added in the cupola charge, they offer many benefits. Of these, the prolonged increase in fluidity is especially advantageous in producing thin section malleable iron castings.

Actual plant records point up these economies . . . show improved product performance and quality as well as worthwhile reductions in scrap losses. These are worth investigating in your own operation. Get detailed information from a representative of our metallurgical staff. An appointment will be arranged at your convenience.



2 **FERROCARBO Briquettes** are widely used as the accepted agent to obtain thorough deoxidation.



3 **FERROCARBO Briquettes** provide prolonged increases in fluidity of iron.

4 **FERROCARBO Briquettes** are credited with improved product performance and reduced scrap losses.

Get These Advantages

1. **Thorough deoxidation.**
2. **Less tendency for internal shrinkage.**
3. **No shrinkage cracks or hot tears close to or at point where risers feed castings.**
4. **Less breakage of castings during "shake-out".**
5. **Shorter annealling time.**

FERROCARBO Briquettes

BY CARBORUNDUM

TRADE MARK

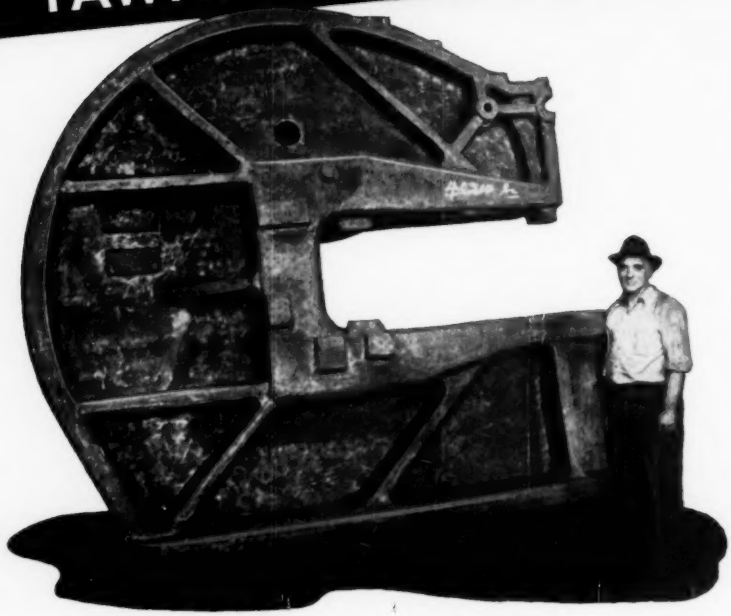
THE CARBORUNDUM COMPANY, Bonded Products and Abrasive Grain Division, Niagara Falls, New York

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland, Birmingham, Philadelphia and Buffalo; Miller and Company, Chicago, St. Louis and Cincinnati; Williams and Wilson, Toronto, Montreal and Windsor.

"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company

they cure "YAWNING" on the job...

. . . with NICKEL CAST IRON



"Yawn" or "give" in a cast machine part often spells rejects for the machine user.

No ordinary cast iron solves this problem, because the low elastic modulus of unalloyed iron under heavy stresses frequently permits dimensional changes.

But..."give" can be reduced to a negligible minimum.

In the 20-ton casting shown above, produced by Schneider Bowman Company, Inc., Philadelphia, Pa., for a large punch press made by Wiedemann Machine Company of Philadelphia..."give" was minimized by casting this part in iron containing 1.50 percent Nickel.

Developing 45,000 pounds per square inch tensile strength in heavy sections, this casting exemplifies the high elastic modulus and strength obtainable with Nickel cast iron.

Hundreds of foundries now use Nickel cast iron to secure these basic advantages:

IN THE FOUNDRY—
Nickel aids the progressive foundry to meet high mechanical property specifications.

IN THE MACHINE SHOP—
Nickel cast irons provide strong, readily machinable castings that take a smooth finish.

IN SERVICE LIFE—
Nickel cast irons assure long, trouble-free performance for the ultimate user.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, copper-base and other alloys containing Nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Ask the men in the Machine Shop--

ARE CASTINGS BETTER?

THEY'LL TELL YOU they've handled thousands of castings but the new lot beats them all. Never before was machining so easy, smooth and fast.

THEY ARE GREATLY RELIEVED of trouble and slow-downs caused by chilled sides ,hollow centers and hard spots in castings.

You SHOULD INVESTIGATE Famous CORNELL CUPOLA FLUX

MALLEABLE FOUNDRIES WITH CUPOLA OPERATION are showing a rapid trend towards the use of Famous Cornell Cupola Flux. After a trial, more and more of them are convinced that they are giving their castings a better start with clean, freer flowing iron. Cupola operation, too, shows a definite improvement—bridging over is greatly reduced, drops are cleaner and life of brick or stone linings is prolonged, due to the formation of glazed or vitrified surface which reduces erosion. The periods between patching and replacement is increased. Maintenance is practically nil.

SCORED BRICK FORM makes the labor in fluxing molten iron practically nil. No digging out of container. No weighing. No measuring.

You simply lift Famous Cornell Cupola Flux out of container and toss it into cupola with each ton charge of iron or break off one to three briquettes (quarter sections) for smaller charges as per instructions.

Unlike flux in other forms, it does not blow out with the blast but *stays* in melting zone until entirely consumed, thus insuring fullest efficiency.

IT IMPROVES CASTING structure by removing slag and other impurities from molten metal and reducing sulphur.

IT MAKES METAL HOTTER AND FREER FLOWING. You pour castings that are unusually sound, even in grain, and reduce rejects.

IT KEEPS CUPOLAS CLEANER, saving time and labor in maintenance.

AND THE COST IS SO SMALL it is forgotten when you see the big returns from the investment.

A TRIAL IS CONVINCING.

Write for Bulletin 46-B

Famous CORNELL ALUMINUM FLUX

CLEANSES MOLTEN ALUMINUM so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive Formula greatly reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

The CLEVELAND FLUX Co.
1026-1040 MAIN AVENUE, N. W.
CLEVELAND 13, OHIO
Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum Flux Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

Famous CORNELL BRASS FLUX

CLEANSES MOLTEN BRASS even when dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves you considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

Complete Foundry
DUST AND FUME CONTROL

- SHAKE OUTS
- MOLD COOLING
- SAND HANDLING
- PATTERN SHOP

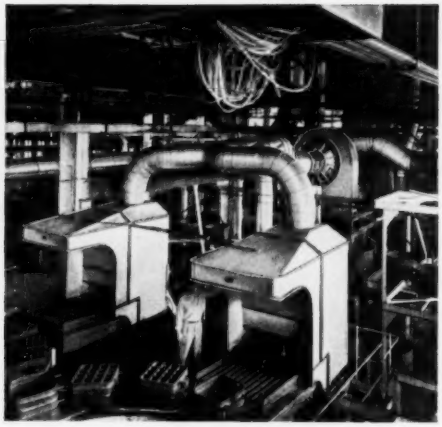
DESIGNED, FABRICATED, and INSTALLED BY KIRK & BLUM

From the pattern shop, where KIRK & BLUM Systems collect and store wood dust and shavings . . . to grinding and snagging operation, where other KIRK & BLUM Systems assure cleanliness and efficient working conditions—KIRK & BLUM has the right answer to every foundry dust and fume problem.

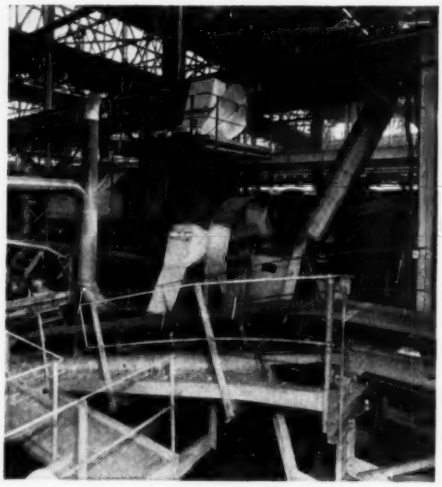
In shake out operations, notoriously one of the worst dust sources, KIRK & BLUM hood design and air application trap dust as it is released. Throughout the foundry, these systems assure maximum efficiency at minimum operating cost.

KIRK & BLUM Systems, in many of the nation's leading foundries, practically eliminate dust and fumes from traditionally "dirty" jobs. For unbiased recommendations, backed by more than 42 years of experience in all types of foundries, call on KIRK & BLUM. Write for the latest edition of Booklet M, "Dust Collecting Systems in Metal Industries." KIRK & BLUM Mfg. Co., 2876 Spring Grove Ave., Cincinnati 25, Ohio.

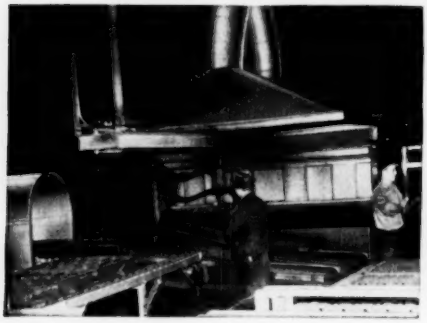
KIRK AND BLUM
DUST AND FUME CONTROL SYSTEMS



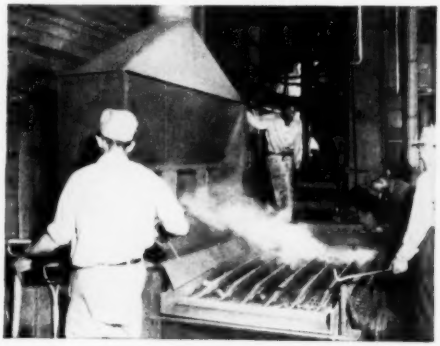
Dust control system on production line shake outs in a well-known midwestern foundry.



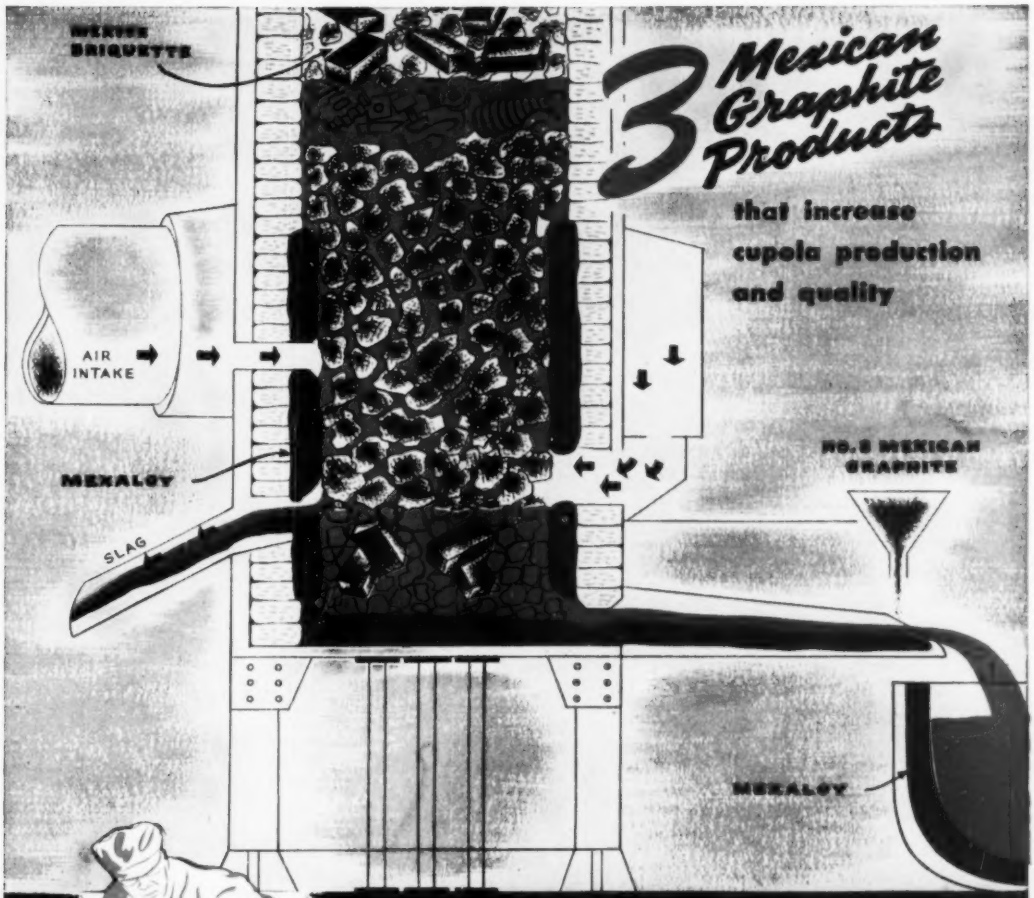
Dust control system on sand handling equipment, one of 17 KIRK & BLUM installations in a large Chicago foundry.



Unretouched photo shows shakeout hood in the Michigan foundry of an automotive parts producer.



In the plant of a leading cast radiation manufacturer, KIRK & BLUM System removes fumes, cools molds and removes dust.



3 Mexican Graphite Products

that increase cupola production and quality

MEXITE BRIQUETTES. One 4-lb. Mexite Briquette provides the same carbon content as 50 lbs. of pig iron when introduced into the cupola charge. Not only do Mexite briquettes sharply reduce melting costs per ton; they also reduce the range of carbon content fluctuation and give a steadier carbon analysis, a particularly vital factor when high percentages of steel are charged.

MEXALOY, applied to cupola linings, ladles, and spouts, resists molten metal and slag and keeps metal free from refractory inclusions. Its natural lubricating action provides low friction surfaces which part easily from metal and slag. A Mexaloy mixture is easily applied to any clean surface. Because it will not melt or change character under intense heat, Mexaloy gives longer refractory life with lower maintenance cost.

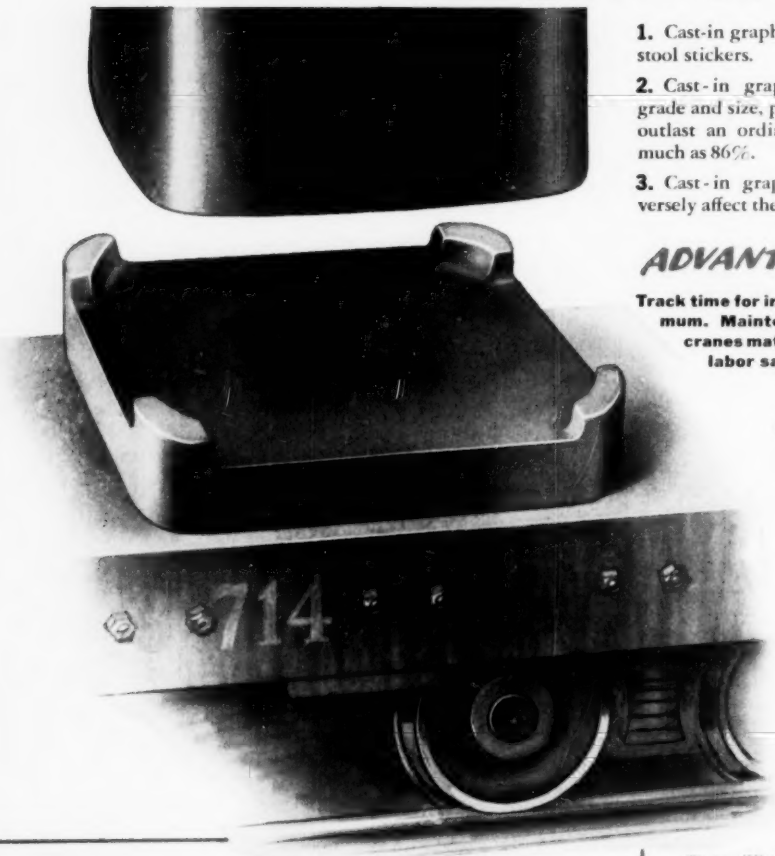
NO. 8 MEXICAN GRAPHITE is used for ladle additions to treat grey cast iron. Trickled into the cupola spout as metal falls into the ladle or with a direct ladle addition, it greatly reduces chill and hardness, producing castings of increased machineability. Normally only 2 lbs. of No. 8 need be added per ton of molten metal—a cost of only ten cents per ton—to assure castings which require no annealing. Write today for complete information on how Mexite Briquettes, Mexaloy, and No. 8 Mexican Graphite will give you better castings for less money.

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

DIVISION OF THE WICKES CORPORATION

ELIMINATE STOOL STICKERS with "NATIONAL" Graphite Stool Inserts!

* **Here are the conclusions drawn from five years of testing "National" graphite stool inserts:**



1. Cast-in graphite stool inserts eliminate stool stickers.

2. Cast-in graphite inserts, of proper grade and size, produce a stool which will outlast an ordinary all-iron stool by as much as 86%.

3. Cast-in graphite inserts do not adversely affect the quality of the steel ingot.

ADVANTAGES ARE!

Track time for ingot trains held to a minimum. Maintenance cost of stripper cranes materially reduced. Time and labor saved all along the line.

*Write for free reprint of "Graphite Stool Inserts for Big-end-down Molds" from the September, 1949, issue of *Iron and Steel Engineer*. Address Dept. AF.

Use Carbon Mold Plugs for Plug-bottom Molds!

No contamination of ingot. • May be used more than once; no stickers. • Light, strong, easy to handle. • Consistently accurate in dimension. • Resist thermal shock and hot-metal erosion.

The term "National" is a registered trade-mark of

NATIONAL CARBON COMPANY, INC.

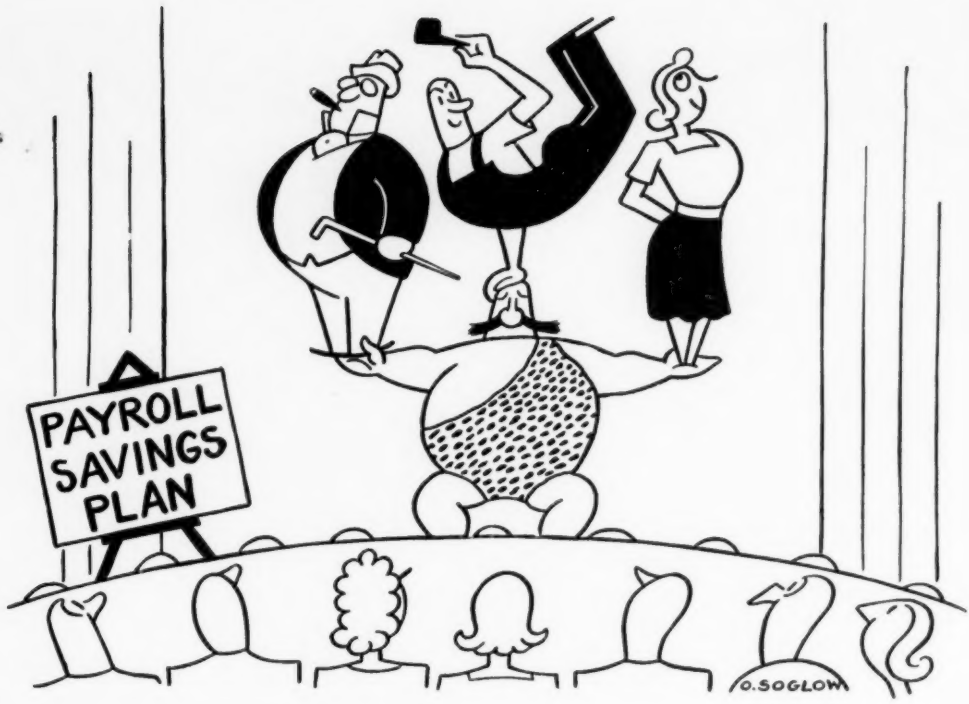
Unit of Union Carbide UCC *and Carbon Corporation*

30 East 42nd Street, New York 17, N. Y.

Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

Foreign Department: New York, U.S.A.

These products sold in Canada by Canadian National Carbon Company, Ltd., Toronto 4.



BOOST THE PLAN that boosts everybody's security!

Everybody who invests in U. S. Savings Bonds gains security for himself—*and contributes to the security of everybody else.* When you promote sales of Bonds through the Payroll Savings Plan in your company, you promote not only the security of your employees but the security of your company . . . your *own* security.

Sound like an idealistic economist's theory? The managements of more than 20,000 companies are proving it in practice.

Employees who get Savings Bonds regularly through Payroll Savings are building a sizable fund for their future needs. (As you know, at ten years these bonds return $4 for $3.) Whenever each worker gazes at his accumulation of Bonds, he realizes he's made a profit on his job. Moreover, he's aware he has a share in his country. He becomes increasingly resistant to any influences which might undermine our way of life.

Because he feels more secure, he quite naturally is also steadier and more efficient in his work.

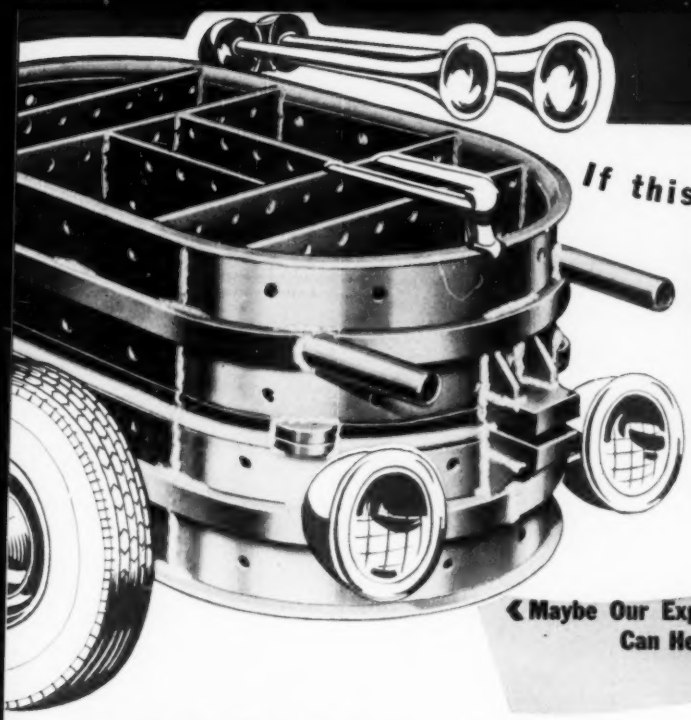
The Bond program is a powerful force in leveling-off boom and bust peaks and valleys. Bond sales spread the national debt. What's more, the billions of dollars in Bonds add up to a tremendous backlog of purchasing power—a boost for your future business.

It's easy to push Payroll Savings in your company with the help of your State Director, U. S. Treasury Department, Savings Bonds Division. Call him, or write the Savings Bonds Division, Treasury Department, Washington, D. C.

The Treasury Department acknowledges with appreciation the publication of this message by

American Foundryman

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.



If this is how you want it—

BS&B CAN BUILD IT for YOU!

Maybe Our Experienced Flask Design Engineers Can Help with Something More Practical

SPECIAL *Fabricated Steel* FLASKS *...in a hurry!*

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MONTREAL, CAN.
Canadian Foundry Sup. & Equipment, Ltd.
OAKLAND, CALIF.
Pacific Graphite Co., Inc.
PHILADELPHIA, PA.
Pennsylvania Foundry Sup. & Sand Co.
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SPEED PRODUCTION OF BETTER, CLEANER CASTINGS AT *Lower Cost*

Three easy-to-understand reasons why more foundries use DELTA Core and Mold Washes . . .

1. **MORE PERFECT CASTINGS . . .**
2. **LOWER CLEANING ROOM COSTS . . .**
3. **LESS SCRAP IN MACHINING.**

DELTA CORE AND MOLD WASH-BASE
Mix with silica flour and water to produce finished wash.

•

FOR STEEL
STEELKOAT — Special Core and Mold Wash.

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FOR GRAY IRON AND MALLEABLE
Grakoat — Blackoat — Hi-temp.

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FOR GRAY IRON
Blackoat S-5 — A new and different wash.

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FOR NON-FERROUS METALS
Non-FerrusKoat.

•

FOR ALL SAND CAST METALS
THERMOKOAT — It's Plasti-Lastic.
PYROKOAT-HI-Speed.

•

FOR UNUSUALLY HIGH TEMPERATURE CONDITIONS
Z-KOAT — High-fusion-temp. Wash.

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There is no "just as good" substitute for any DELTA Core and Mold Wash just as there is no substitute for DELTA'S scientific laboratory control of production which safeguards the quality and uniformity of all DELTA Foundry Products. DELTA Research laboratories developed, and pioneered the use of, Plastic-type Core and Mold Washes . . . and still leads the field in the development of new products for improved foundry practices.

NEW mechanical processing and improved chemical formulation . . . developed by DELTA Research . . . have resulted in many decided advancements in both the quality and characteristics of DELTA CORE and MOLD WASHES.

Maximum uniformity of surface coverage is obtained with lower Beaume mixes, using more water. Penetration characteristics are THREE times greater (from 10 to 12 grains deep) and the density of the wash on the surface has been increased 40%.

Due to increased surface density the rate heat conductivity is speeded up and metal in contact with the washed surfaces cools more rapidly, resulting in smoother casting finish.

HERE'S WHY

a. Delta Core and Mold Washes "Anchor" themselves by penetrating from 10 to 12 grains deep into the sand. This bond between the wash and the sand . . . a distinctive DELTA characteristic . . . produces an expansion-resisting coating essential to the production of finer finished castings.

b. The hot strength of Delta Core and Mold Washes increases with each degree of temperature rise from 1800°F to 3000°F providing maximum critical hot strength for all foundry applications.

The higher hot strength of DELTA Core and Mold Washes eliminates surface sand fissuring, excessive sand expansion and distortion.

c. No gas leakage through Delta Core and Mold washed surfaces. Gases produced by decomposition of organic binders in the core sand cannot leak through Delta Core and Mold washed surfaces to contact the molten metal. Only Delta Core and Mold Washes provide this unique and all-important insurance against defective castings resulting from core gas leakage. DELTA Core and Mold Washes insure more perfect castings with finer finished surfaces.

● *Ask for a liberal working sample. You will also receive complete data on how to use DELTA Core and Mold Washes in your foundry.*

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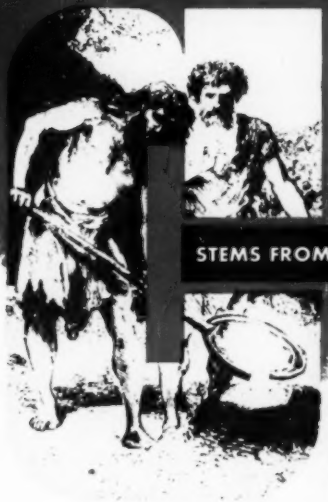


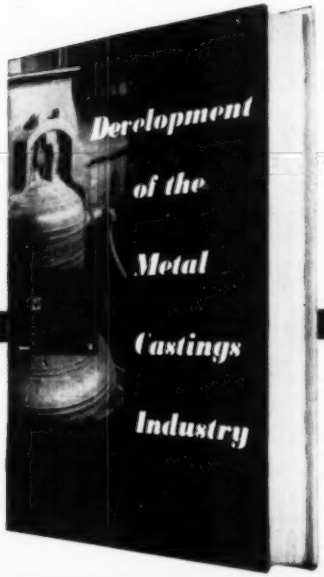
raft"

STEMS FROM AN APPRECIATION OF HISTORICAL BACKGROUND

This history of foundry practice, from the days of prehistoric development of metal to modern castings production, brings into sharp focus the fact confirmed by scientific history . . . *progress can be only as swift as research and equipment permit.*

It is the story of man's achievements, through his use of metal, which have contributed so essentially to modern civilization.

Profusely illustrated, this clothbound, 250-page book enables the modern foundryman to glean a deeper appreciation of the field in which he operates. A combination of fact and romance, "*Development of the Metal Castings Industry*" dramatizes the progress of foundry practice . . . a craft as old as mankind, an industry that constantly attunes itself to the needs of modern living.



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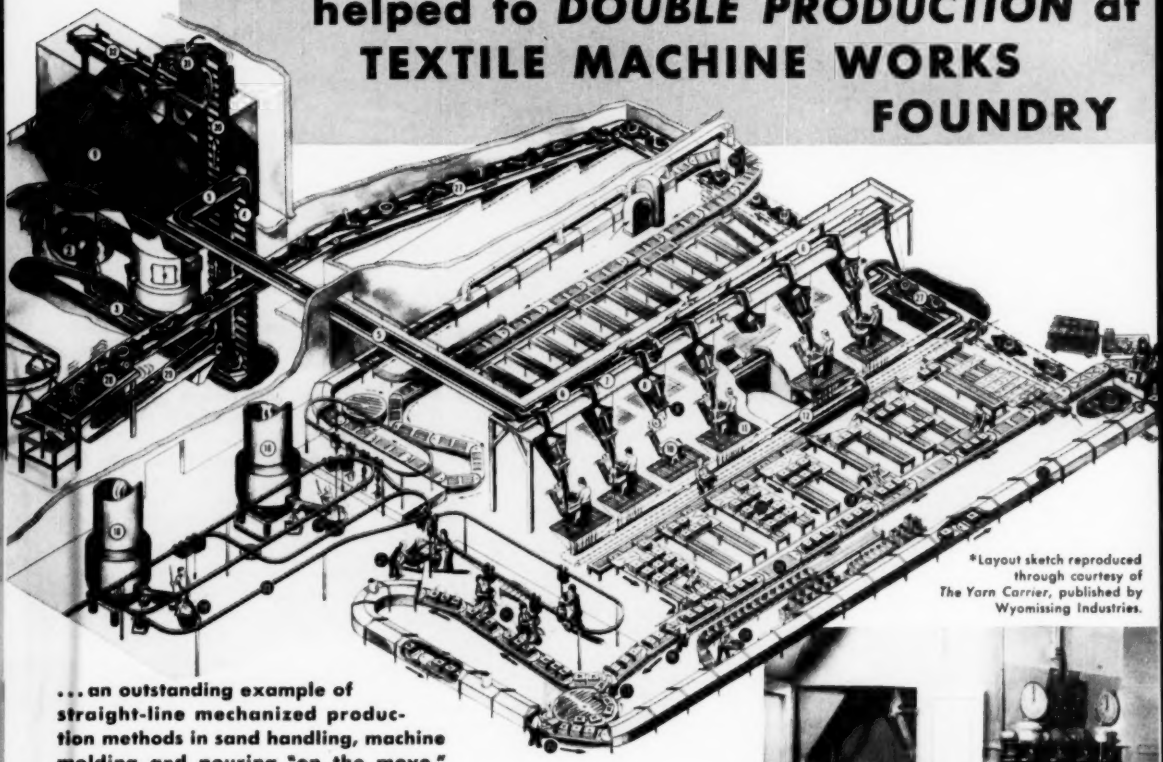
How NATIONAL *Mechanized* EQUIPMENT helped to *DOUBLE PRODUCTION* at TEXTILE MACHINE WORKS FOUNDRY



*Layout sketch reproduced through courtesy of *The Yarn Carrier*, published by Wyomissing Industries.

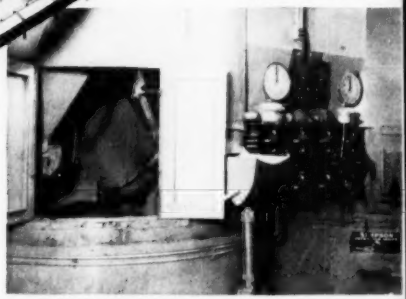
...an outstanding example of straight-line mechanized production methods in sand handling, machine molding and pouring "on the move."

TEXTILE MACHINE WORKS, Reading, Pa., are already famous for operating one of the largest, most modern foundries in the country. Now, adding to that accomplishment, this progressive company has completed installation of the highly mechanized unit shown here* for large-scale production of small and medium size gray iron castings. Designed and installed by National Engineering, in conjunction with Mr. H. P. Good and the Foundry Division of Textile Machine Works, reports on this equipment show these results:

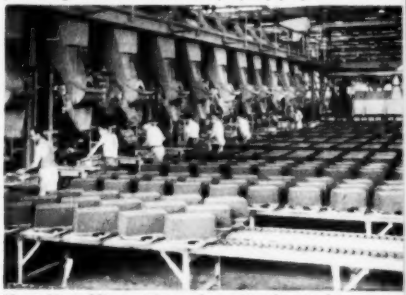
> *Production has been practically doubled, without increasing floor space. Quality has been maintained, without any increase in scrap percentage. Production per molder per day has nearly tripled. Costs have been reduced considerably, with comparable increases in molders' earnings.*

With the appreciable per pound saving in casting cost made possible through this mechanization program, the entire investment is expected to pay for itself in 5 years. Here, then, is a practical, *mechanized* answer to the problem of increased production of highest quality castings at lower cost.

Let a National Engineer show you how these methods can be applied to solve your production problems. Write for further details.



Two SIMPSON MIXERS at Textile Machine Works, each producing 3500 lb. batches of properly prepared sand.



These 12 molding stations of one Textile unit face 15 stations of the second unit—both served by individual power mold conveyors.

SIMPSON Intensive MIXERS

NATIONAL *Engineering Company*

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Send for Bulletin

describing the complete Textile Machine Works installation. Write for your copy today.

CREATIVE SELLING

EVERYONE HAS TO SELL SOMEBODY something to be a success, according to a speaker at a recent regional foundry conference. How successful the foundry industry and those who earn a living from it can be is determined to a considerable extent by the industry's ability to sell purchasers on the advantages of castings over other types of metal—in some cases non-metal—parts.

Even the most enthusiastic foundryman recognizes that castings do not fulfill every manufacturing need, but there are numerous instances where castings meet all the requirements and meet them better.

The theme "Castings Can Do It *Better*"* has been played with many variations, particularly during the latter part of the war and in past few years. Now increased emphasis is being placed on the importance . . . the necessity . . . of creative selling.

Foundrymen are becoming aware that the better mouse trap theory of selling is not in itself sufficient to keep production at a reasonably profitable level. They realize to an increasing degree that somebody has to be sold on the merits of a casting in every case where a casting can conceivably meet specifications if the industry is to achieve the fullest measure of success.

For greatest effect the process of advising the customer on better design of existing castings, and how to replace other products with castings advantageously must be continual. And it must be carried on by foundrymen everywhere.

Up to now the campaign has been waged by a few far-seeing individuals and by committees of some of the foundry organizations. The American Foundrymen's Society has long been a proponent of closer relations between the designers and users of castings and the patternmakers and foundrymen who produce them. Inevitable result of conferences between producer and consumer is greater appreciation by the customer of the flexibility of the casting process and the realization that it provides the shortest route from raw material to finished product.

For some two years the Steel Founders' Society has had a Product Development Committee whose activities have centered on the problems of creative selling. Merchandising activities of the Malleable Founders' enter the educational stage March 22 and 23 when a marketing conference will be held at Northwestern University. Sound selling has figured prominently in the activities of the Gray Iron Founders' Society and other foundry organizations.

Recognition of the value of promotion is evidenced by the increasing appearance of foundry and castings exhibits at state and county fairs and at local and national trade shows. Emphasis in most of these exhibits is on the versatility of the casting process and on the finished products which depend so much on castings for their value to the public.

There is ample evidence that foundrymen are thinking more and more about creative selling. A research project now underway is expected to provide for casting of lightweight tubular structural members. Automobile door frames are being die-cast. Cast magnesium alloy hammer handles can be produced which are four or five times as strong as a hickory handle and which weigh only a few ounces more.

This is creative selling!

Products formerly made by other means are being replaced by metal castings because "Castings Can Do It *Better*." Better may mean improved appearance . . . lower cost . . . faster delivery . . . superior or special properties . . . elimination of extra operations . . . greater flexibility in production.

The foundry industry will be well on the road to making creative selling a habit when every foundry, captive or not, can show at least one current example of a product now cast which was formerly produced another way. If everyone in the foundry industry sells castings and the casting process to somebody, the creative selling program will be a success.

—*Editor.*

*Title of article by Bruce L. Simpson, National Engineering Co., Chicago, AMERICAN FOUNDRYMAN, January, 1950, page 34.

Cleveland Awaits

54th A.F.S. Foundry Congress and Show

CORRELATION AND INTEGRATION of technical exhibits, housing and administrative plans for the 54th A.F.S. Foundry Congress and Show, to be held in Cleveland, May 8-12, are now in final stages.

Now completed is the official program of events for five days of technical sessions, with the nation's leading authorities on the many phases of the foundry industry scheduled as speakers. Many foundry equipment manufacturers will exhibit their products for the first time, as well as those organizations who have for years been outstanding contributors to the success of A.F.S. Shows. This year, for the first time since 1936, equipment manufacturers will actually pour metal as a feature of the Show, and for the first time in many years, foreign firms will exhibit their products.

Recently mailed to all Convention exhibitors is a brochure containing detailed directions and coupons for arrangement of booth furniture, utilities, signs, freight handling, and such services as booth cleaning, carpentry, labor, guard service, water coolers, floral arrangements, motion picture operation, telephones and photographers. Containing detachable coupons for mailing to A.F.S. Headquarters, Chicago, the booklet provides a convenient means of relieving exhibitors of much of the detail work involved in presenting their products at the 1950 Show.

Foundrymen and members of allied industries who plan to attend the 1950 Foundry Congress are requested to submit applications for hotel rooms and suites at the earliest possible date. Preference is being given early applications, officials of the Cleveland Convention Housing Bureau state.

Program of Broad Interest

The program of the 1950 A.F.S. Foundry Congress and Show, to be held in Cleveland's Municipal Auditorium will feature five days of technical sessions, the Annual Banquet, Annual Business Meeting, Charles Edgar Hoyt Lecture, Northeastern Ohio Day, round table luncheons, shop courses, and the Chapter Officers and Directors, Canadian, Non-Ferrous "Father-Son", Educational and Alumni dinners.

The Charles Edgar Hoyt Annual Lecture, highlight of the Convention technical program, will be presented at the conclusion of the Annual Business Meeting, May 10, by W. W. Levi, Lynchburg Foundry Co., Lynchburg, Va., who will speak on "*Operation of the Cupola.*" Already scheduled are the 1950 Exchange Paper of the Institute of British Foundrymen—"*Aluminum Alloy Castings, A Review of British Achievement,*" by Frank Hudson, Mond Nickel Co., Ltd.; and the Exchange Paper of the French Foundry Technical Association, which will be presented by Jean Maurice Laine, technical secretary of the French Foundry Technical Association.

Malleable

Malleable Division program plans have not as yet been finalized but call for three technical sessions on May 8 and 9, the annual Malleable Round Table Luncheon and joint sponsorship with the Gray Iron Division of a symposium on nodular iron, Wednesday Morning, May 10, at which speakers will be Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., on "*Problems in Producing Ductile Iron,*" and J. E. Rehder, Canadian Bureau of Mines, Ottawa, on "*An Introduction to the Annealing of Nodular Iron.*"

Brass and Bronze

Opening Monday morning, May 8, the A.F.S. Brass and Bronze Division's program will consist of technical sessions on May 8 and 9, the annual Brass and Bronze Round Table Luncheon, and participation in the new Non-Ferrous Shop Course the evenings of May 8 and 9, and the Non-Ferrous Founders' Society's "Father-Son" Dinner, May 8.

Monday morning's session will feature two papers: "*An Investigation of Melting and Casting Procedures for High-Purity Nickel,*" by D. W. Grobecker, Los Alamos Scientific Laboratory, Los Alamos, N. M.; and "*Effect of Graphitic Structures on the Properties of Nickel Castings,*" by J. T. Eash, International Nickel Co., Bayonne, N. J. Afternoon session will have "*Manufacture of Fusible Bar Plugs,*" by J. R. Davidson, Southern Pacific Railroad; and "*Melt Quality and Fracture Characteristics of 85-5-5-5,*" a progress report on the Brass and Bronze Research Project given by F. B. Rote, University of Michigan.

Concluding Monday's Brass and Bronze technical sessions will be "*Effect of Superheating and Casting Temperatures on Properties of Tin Bronzes,*" by B. N. Ames and N. A. Kahn, New York Naval Shipyard, New York. In the evening, the first of two Non-Ferrous Sand Shop Courses and the Non-Ferrous "Father-Son" Dinner will be held.

Tuesday's Brass and Bronze technical sessions will

open with "*Preparation and Application of Metal Ingot Specifications for Brass and Bronze Foundry*," by J. G. Dick, Canadian Bronze, Ltd., followed by "*Aluminum Additions in Commercial Yellow Brass*," by R. A. Colton, American Smelting & Refining Co.

The Brass and Bronze Round Table Luncheon will feature discussion lead by Howard F. Taylor, Massachusetts Institute of Technology, on "*Casting Defects*." Concluding technical session will be held the afternoon of May 9, with the last of the Non-Ferrous Shop Course sessions that evening.

Aluminum & Magnesium

Aluminum & Magnesium Division's two day program will comprise four technical sessions on May 8 and 9, the Aluminum & Magnesium Round Table Luncheon on May 8, and the Non-Ferrous Shop Course, new this year, to be held the evenings of May 8 and 9 and open free of charge to foundrymen of the Cleveland area as well as to Convention registrants.

Opening the Division's program on Monday, May 8, will be a showing of the A.F.S. film, "*Fluid Flow in Transparent Molds*," with L. W. Eastwood of Battelle Memorial Institute, Columbus, Ohio, as narrator. The Aluminum and Magnesium Round Table Luncheon, to be held Monday noon, will feature a discussion of "*Test Bar Gating*," with Walter Bonsack of Cleveland as chairman. The Monday afternoon session will have M. W. Martinson and J. W. Meier of the Canadian Bureau of Mines, Ottawa, speaking on "*Magnesium Foundry Practice in Canada*," and A. Juroff of Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., speaking on "*Equipment for Chromium Treatment of Magnesium Alloy Foundry Melts*."

In the evening, the Non-Ferrous Founders' Society will sponsor the Non-Ferrous "Son-Father" Dinner. The evening session of the new Non-Ferrous Shop Course will climax the Division's first-day activities.

Opening the Aluminum and Magnesium Division's Tuesday, May 9, sessions will be "*New Al-Zn-Mg-Cu Casting Alloys*," by Walter E. Sicha and H. Y. Hunsicker of the Aluminum Co. of America, Cleveland. E. C. Reichard, American Smelting & Refining Co., Barber, N. J., and R. A. Quadt will present a paper on "*Corrosion and Stress Corrosion Properties of High-Strength Al-Zn-Mg-Cu Casting Alloy*."

Concluding Aluminum & Magnesium Division technical session, the afternoon of May 9, will feature the Official Exchange Paper of the Institute of British Foundrymen to the A.F.S. Convention—"*Aluminum Alloy Castings—A Review of British Achievement*," by Frank Hudson, Mond Nickel Co., Ltd., to be presented

National Office Moves

Since Monday, March 6, the National Office of the American Foundrymen's Society has been located at

616 South Michigan Ave., Chicago 5, Ill.

The new office occupies the entire 8th floor of the building, utilizing approximately the same amount of space as before, but for considerably less rent. The National Office had been at the former address, 222 West Adams St., since 1927.

Partial List of Exhibitors for 1950 Foundry Show

Accurate Match Plate Co., Inc.	Chicago, Ill.
The Adams Co.	Dubuque, Iowa
Aerodyne Development Corp.	Cleveland, Ohio
Air Reduction Sales Co.	New York, N. Y.
Ajax Electrothermic Corp.	Trenton, N. J.
Ajax Engineering Co.	Trenton, N. J.
Ajax Flexible Coupling Co.	Westfield, N. Y.
Ajax Metal Co.	Trenton, N. J.
Allis Chalmers Mfg. Co.	Milwaukee, Wis.
Alloy Metal Abrasive Co.	Ann Arbor, Mich.
The Alpha-Lux Co., Inc.	New York, N. Y.
American Air Filter Co., Inc.	Louisville, Ky.
American Colloid Co.	Chicago, Ill.
American Crucible Co.	North Haven, Conn.
American Gas Association	New York, N. Y.
American Metal Market	New York, N. Y.
American Wheelabrator & Equipment Corp.	Mishawaka, Ind.
Apex Smelting Co.	Chicago, Ill.
The Asbury Graphite Mills, Inc.	Asbury, N. J.
Avers Mineral Co.	Zanesville, Ohio
Bakelite Div., Union Carbide & Carbon Corp.	New York, N. Y.
Baroid Sales Div., National Lead Co.	Chicago, Ill.
C. O. Bartlett & Snow Co.	Cleveland, Ohio
Bay State Abrasive Products Co.	Westboro, Mass.
Beardsley & Piper Div., Pettibone Mulliken Corp.	Chicago, Ill.
Black Products Co.	Chicago, Ill.
Black, Sivalls & Bryson, Inc.	Kansas City, Mo.
Blaw Knox Co.	Pittsburgh, Pa.
Blystone Div., Standard Sand & Machine Co.	Chicago, Ill.
The Borden Co.—Chemical Div.	New York, N. Y.
British Moulding Machine Co. Ltd.	Faversham, Kent, England
Buckeye Products Co.	Cincinnati, Ohio
Campbell Hausfeld Co.	Harrison, Ohio
Canton Chaplet & Mfg. Co.	Canton, Ohio
The Carborundum Co.	Niagara Falls, N. Y.
Central Silica Co.	Zanesville, Ohio
Centrifugal Casting Machine Co.	Tulsa, Okla.
Chain Belt Co.	Milwaukee, Wis.
Champion Foundry & Machine Co.	Chicago, Ill.
Clearfield Machine Co.	Clearfield, Pa.
Cleco Div., Reed Roller Bit Co.	Houston, Tex.
The Cleveland Crane & Engineering Co.	Wickliffe, Ohio
The Cleveland Flux Co.	Cleveland, Ohio
The Cleveland Metal Abrasive Co.	Cleveland, Ohio
Cleveland Quarries Co.	Cleveland, Ohio
Cleveland Vibrator Co.	Cleveland, Ohio
Climax Molybdenum Co.	New York, N. Y.
L. A. Cohn & Bro., Inc.	Chicago, Ill.
Combined Supply & Equipment Co.	Buffalo, N. Y.
Conover Engineering Co.	Cleveland, Ohio
Corn Products Sales Co.	New York, N. Y.
D C M I Sales Corp.	New York, N. Y.
Davenport Machine & Foundry Co.	Davenport, Ia.

by Hiram Brown, Solar Aircraft Co., Des Moines. Second session of the Non-Ferrous Shop Course Tuesday night will conclude the Division's program.

Sand

A.F.S. Sand Division's program consists of three of the popular Sand Shop Courses, held the evenings of May 8, 9 and 11, and open to Cleveland area foundrymen without charge, technical sessions on May 9, 10 and 11, and a joint symposium with the Steel Division the morning of May 11.

Opening the Division's program will be the first of three Sand Shop Courses, Monday night, May 8. Technical sessions will begin Tuesday afternoon, May 9, with J. E. McMillan, Monsanto Chemical Co., Springfield, Mass., speaking on "*Effect of Core Mix on Physical Properties.*" A Sand Shop Course will again be held that evening.

Wednesday morning's Sand Division program will open with Bradley H. Booth, Carpenter Bros., Inc., Milwaukee, speaking on "*Reproducibility of Foundry Sand Tests,*" followed by "Treatment of Bond Clays for Foundry Sand," by A. E. Pavlish, Battelle Memorial Institute, Columbus, Ohio.

The morning of Thursday, May 11, will have as technical session speakers R. E. Morey and C. G. Ackerlind, Naval Research Laboratory, Washington, D. C., on "*Influence of Binders and Additives on Hot Strength of Molding Sand,*" and "*Factors Affecting Molding Sand Density, Shrinkage and Workability,*" by R. P. Schauss and R. F. Baley, Illinois Clay Products Co., Chicago, and E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

Sponsored jointly by the Sand and Steel Divisions will be a symposium Thursday afternoon, May 11, on "*Interpretation of Sand Tests as Related to Steel Castings,*" with Charles Locke, Armour Research Foundation, Chicago, presiding. Concluding the Division's program will be the final Sand Shop Course the night of May 11.

Education

Educational Division's program calls for a Round Table Discussion session Tuesday afternoon, May 9, on "*High School and Trade School Training,*" with W. J. MacNeill, Dayton Malleable Iron Co.; J. H.

EXHIBITORS' LIST

(Continued)

Dayton Oil Co.	Dayton, Ohio
Dayton Pneumatic Tool Co.	Dayton, Ohio
Delhi Foundry Sand Co.	Cincinnati, Ohio
Delta Oil Products Co.	Milwaukee, Wis.
Wm. Demmler & Bros.	Kewanee, Ill.
Detroit Electric Furnace Div. Kuhlman Electric Co.	Bay City, Mich.
Diamond Clamp & Flask Co.	Richmond, Ind.
Joseph Dixon Crucible Co.	Jersey City, N. J.
Harry W. Dietert Co.	Detroit, Mich.
DoAll Cleveland Co.	Cleveland, Ohio
Dougherty Lumber Co.	Cleveland, Ohio
Eastern Clay Products, Inc.	Jackson, Ohio
Eastman Kodak Co.	Rochester, N. Y.
Economy Tool & Machine Co.	Muskegon, Mich.
Electric Controller & Mfg. Co.	Cleveland, Ohio
Electro Metallurgical Div. Union Carbide & Carbon Corp.	New York, N. Y.
Electro Refractories & Alloys Corp.	Buffalo, N. Y.
Exomet, Inc.	Conneaut, Ohio
Exothermic Alloys Sales & Service, Inc.	Chicago, Ill.
The Fanner Mfg. Co.	Cleveland, Ohio
The Federal Foundry Supply Co.	Cleveland, Ohio
Federated Metals Div. American Smelting & Refining Co.	New York, N. Y.
Fisher Furnace Div. Lindberg Engineering Co.	Chicago, Ill.
The Foundry, Penton Publishing Co.	Cleveland, Ohio
Foundry Equipment Co.	Cleveland, Ohio
Foundry Educational Foundation	Cleveland, Ohio
Foundry Equipment Ltd.	Bedfordshire, England
Foundry Service Co.	Birmingham, Ala.
Fox Grinders, Inc.	Pittsburgh, Pa.
Foxboro Co.	Foxboro, Mass.
The Freeman Supply Co.	Toledo, Ohio
The Fremont Flask Co.	Fremont, Ohio
General Electric X-Ray Corp.	Milwaukee, Wis.
Girdler Corp., Thermex Div.	Louisville, Ky.
Claud S. Gordon Co.	Chicago, Ill.
Gray Iron Founders' Society, Inc.	Cleveland, Ohio
Great Lakes Carbon Corp.	Niagara Falls, N. Y.
Great Lakes Foundry Sand Co.	Detroit, Mich.
Great Western Mfg. Co.	Leavenworth, Kan.
Harbison-Walker Refractories Co.	Pittsburgh, Pa.
Harnischfeger Corp.	Milwaukee, Wis.
Benj. Harris & Co.	Chicago, Ill.
Harrison Machine Co.	Erie, Pa.
Hercules Powder Co.	Wilmington, Del.
Herman Pneumatic Machine Co.	Pittsburgh, Pa.
Hewitt-Robins, Inc. Robins Conveyors Div.	New York, N. Y.
Hickman, Williams & Co.	Cleveland, Ohio
Hill & Griffith Co.	Cincinnati, Ohio
The Hoffman Foundry Supply Co.	Cleveland, Ohio
Hines Flask Co.	Cleveland, Ohio
Frank G. Hough Co.	Libertyville, Ill.
E. F. Houghton & Co.	Philadelphia, Pa.
Hougland & Hardy, Inc.—Hardy Sand Co.	Evansville, Ind.
Hydro Blast Corp.	Chicago, Ill.
Illinois Clay Products Co.	Chicago, Ill.
Illinois Testing Labs., Inc.	Chicago, Ill.
Industrial Fabricating, Inc.	Eaton Rapids, Mich.
Industrial Minerals Co.	Lancaster, Ohio

EXHIBITORS' LIST

(Continued)

International Graphite & Electrode Corp. ..... St. Marys, Pa.
International Molding Machine Co. ..... LaGrange Park, Ill.
International Nickel Co., Inc. ..... New York, N. Y.
The Iron Age ..... New York, N. Y.
Iron Lung Ventilator Co. ..... Cleveland, Ohio

Jeffrey Mfg. Co. ..... Columbus, Ohio
William F. Jobbins, Inc. ..... Aurora, Ill.

K & F Metal Spray Industries ..... Detroit
The Kindt-Collins Co. ..... Cleveland, Ohio
Andrew King ..... Narberth, Pa.
Lester B. Knight & Associates ..... Chicago, Ill.
Wm. Korn, Inc. ..... New York, N. Y.
H. Kramer & Co. ..... Chicago, Ill.
Kwik-Mix Co. ..... Port Washington, Wis.

Laboratory Equipment Corp. ..... St. Joseph, Mich.
Lava Crucible Co. of Pittsburgh ..... Pittsburgh, Pa.
R. Lavin & Sons, Inc. ..... Chicago, Ill.
Link-Belt Co. ..... Chicago, Ill.

Macklin Co. ..... Cincinnati, Ohio
The Macleod Co. ..... Cincinnati, Ohio
Magnaflux Corp. ..... Chicago, Ill.
Manley Sand Co. ..... Rockton, Ill.
Martin Engineering Co. ..... Kewanee, Ill.
Martindale Electric Co. ..... Cleveland, Ohio
Master Pneumatic Tool Co., Inc. ..... Cleveland, Ohio
Mathews Conveyers Co. ..... Ellwood City, Pa.
J. S. McCormick Co. ..... Pittsburgh, Pa.
Metallizing Co. of America ..... Chicago, Ill.
Mexico Refractories Co. ..... Mexico, Mo.
Michigan Smelting & Refining Div.
  Bohn Aluminum & Brass Corp. ..... Detroit, Mich.
Millwood Sand Co. ..... Zanesville, Ohio
Minco Products Corp. ..... Saginaw, Mich.
Mine Safety Appliances Co. ..... Pittsburgh, Pa.
Modern Equipment Co. ..... Port Washington, Wis.
The Monk Tool Co. ..... Geneva, Ill.
Monsanto Chemical Co. ..... St. Louis, Mo.
The Moulders' Friend ..... Dallas City, Ill.

Nassau Smelting & Refining Co. ..... Staten Island, N. Y.
National Carbon Div.
  Union Carbide & Carbon Corp. ..... New York, N. Y.
National Crucible Co. ..... Philadelphia, Pa.
National Engineering Co. ..... Chicago, Ill.
National Foundry Assn. ..... Chicago, Ill.
Newaygo Engineering Co. ..... Newaygo, Mich.
New Jersey Silica Sand Co. ..... Millville, N. J.
Niagara Falls Smelting & Refining Div.
  Continental Copper & Steel Industries, Inc. ..... Buffalo, N. Y.
Wm. H. Nicholls Co., Inc. ..... Richmond Hill, N. Y.
Nichols Engineering & Research Corp. ..... New York, N. Y.
North American Smelting Co. ..... Wilmington, Del.
Norton Co. ..... Worcester, Mass.

S. Obermayer Co. ..... Chicago, Ill.
Oliver Machinery Co. ..... Grand Rapids, Mich.
The Osborn Mfg. Co. ..... Cleveland, Ohio

P M S Co. ..... Cleveland, Ohio
Pangborn Corp. ..... Hagerstown, Md.
Peerless Mineral Products Co. ..... Conneaut, Ohio
Peninsular Grinding Wheel Co. ..... Detroit, Mich.
Penola Inc. ..... Detroit, Mich.
George F. Pettinos, Inc. ..... Philadelphia, Pa.
Pittsburgh Crushed Steel Co. ..... Pittsburgh, Pa.
Pittsburgh Lectromelt Furnace Corp. ..... Pittsburgh, Pa.
Precision Grinding Wheel Co., Inc. ..... Philadelphia, Pa.

Smith, Central Foundry Div., GMC; and Peter E. Rentschler, Hamilton Foundry & Machine Co., as discussion leaders. Speakers at the Educational Dinner, May 9, will be F. W. Shipley and B. L. Bevis, Caterpillar Tractor Co., Peoria, Ill., on *"Foundry Apprentice Training at Caterpillar Tractor Co."* and N. J. Stickney, University of Wisconsin, on *"Engineering Student and Summer Foundry Work."*

Gray Iron

Gray Iron Division's program calls for three Gray Iron Shop Courses the evenings of May 8, 9 and 11, two joint sessions with the Malleable Division, the Gray Iron Round Table Luncheon, a joint session with the Steel Division and technical sessions on Thursday and Friday, May 11 and 12.

Opening technical session will be sponsored jointly with the Malleable Division the morning of May 10 and will be a symposium on nodular iron with Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., speaking on *"Problems in Producing Nodular Iron,"* followed by *"An Introduction to the Annealing of Nodular Iron,"* by J. E. Rehder, Canadian Bureau of Mines, Ottawa.

Gray Iron Round Table Luncheon will be held at noon May 10 with C. C. Sigerfoos, Michigan State College, leading a discussion on *"The Effect of Mold Materials on Metal Shrinkage."*

Thursday, May 11, technical Gray Iron speakers scheduled to date include Richard Schneidewind of the University of Michigan on *"Composition and Properties of Gray Iron;"* B. T. Malcolm and S. Low of the Chapman Valve Co., Indian Orchard, Mass., on *"The Relaxation of Cast Iron;"* R. A. Flinn and R. W. Kraft, American Brake Shoe Co., Mahwah, N. J., on *"Improved Test Bars for Standard and Ductile Grades of Cast Iron;"* and A.F.S. Gray Iron Division Chairman R. G. McElwee, Vanadium Corp. of America, Detroit, reporting on the work of the A.F.S. Cupola Research Committee. Concluding Thursday's Gray Iron program will be the last of the three Shop Courses.

Friday's Gray Iron sessions will include papers by R. G. McElwee, Vanadium Corp. of America, Detroit, on *"Correlation of Properties of Cast Iron;"* and S. F. Carter, American Cast Iron Pipe Co., Birmingham, on the *"Basic Lined Cupola."* Joint Gray Iron and Mal-

EXHIBITORS' LIST

(Continued)

The Pyro Refractories Co.	Oak Hill, Ohio
Pyrometer Instrument Co., Inc.	Bergenfield, N. J.
The Ready Power Co.	Detroit, Mich.
Redford Iron & Equipment Co.	Detroit, Mich.
W. G. Reichert Engineering Co.	Newark, N. J.
Reliable Castings Corp.	Cincinnati, Ohio
Republic Coal & Coke Co.	Chicago, Ill.
H. H. Robertson Co.	Pittsburgh, Pa.
Robinson Clay Products Co.	Akron, Ohio
Rockwell Mfg. Co. Power Tool Div.	Milwaukee, Wis.
Roots-Connersville Blower Corp.	Connersville, Ind.
Ross-Tacony Crucible Co.	Philadelphia, Pa.
Rossborough Supply Co.	Cleveland, Ohio
The Rotor Tool Co.	Cleveland, Ohio
Royer Foundry & Machine Co.	Kingston, Pa.
Safety Clothing & Equipment Co.	Cleveland, Ohio
Safety First Shoe Co.	Holliston, Mass.
Sand Products Corp.	Cleveland, Ohio
Claude B. Schneible Co.	Detroit, Mich.
Schramm Inc.	West Chester, Pa.
A. Schrader's Son Div. Scovill Mfg. Co., Inc.	Brooklyn, N. Y.
I. Schumann & Co.	Cleveland, Ohio
Scientific Cast Products Corp.	Cleveland, Ohio
Semet-Solvay Div., Allied Chemical & Dye Corp.	New York, N. Y.
Severance Tool Industries, Inc.	Saginaw, Mich.
Simonds Abrasive Co.	Philadelphia, Pa.
Simplicity Engineering Co.	Durand, Mich.
W. W. Sly Mfg. Co.	Cleveland, Ohio
Werner G. Smith Co.	Cleveland, Ohio
Smith Facing & Supply Co.	Cleveland, Ohio
Smith Oil & Refining Co.	Rockford, Ill.
Smith & Richardson Mfg. Co.	Geneva, Ill.
Sorbo-Mat Process Engineers	St. Louis, Mo.
Spencer Turbine Co.	Hartford, Conn.
SPO Inc.—Milwaukee Foundry Equipment Div.	Cleveland, Ohio
Standard Conveyor Co.	No. St. Paul, Minn.
Standard Horse Nail Corp.	New Brighton, Pa.
Steel Shot Producers, Inc.	Butler, Pa.
Sterling Wheelbarrow Co.	Milwaukee, Wis.
Frederic B. Stevens, Inc.	Detroit, Mich.
Stoller Chemical Co.	Akron, Ohio
Stroman Furnace & Engineering Co.	Franklin Park, Ill.
Sutter Products Co.	Dearborn, Mich.
Swan-Finch Oil Corp.	New York, N. Y.
Syntron Co.	Homer City, Pa.
Tabor Mfg. Co.	Philadelphia, Pa.
Taggart-Brimfield Co.	Hammonton, N. J.
Tamms Industries, Inc.	Chicago, Ill.
Thiem Products, Inc.	Milwaukee, Wis.
Tincher Products Co.	Sycamore, Ill.
Titanium Alloy Mfg. Div., National Lead Co.	New York, N. Y.
Toledo Scale Co.	Toledo, Ohio
Towmotor Corp.	Cleveland, Ohio
United Oil Mfg. Co.	Erie, Pa.
U. S. Graphite Co., Div. of the Wickes Corp.	Saginaw, Mich.
U. S. Gypsum Co., Ind. Sales Div.	Chicago, Ill.
U. S. Rubber Co.	New York, N. Y.
U. S. Hoffman Machinery Corp.	New York, N. Y.
Vanadium Corp. of America	New York, N. Y.
Velsicol Corp.	Chicago, Ill.
Vesuvius Crucible Co.	Pittsburgh, Pa.
Wheelco Instruments Co.	Chicago, Ill.
White Pine Lumber Co.	Chicago, Ill.
Whitehead Brothers Co.	New York, N. Y.
Whiting Corp.	Harvey, Ill.
Zanesville Sand Co.	Zanesville, Ohio

leable session Friday afternoon will feature *"Dilatometer Studies of Nodular Cast Iron,"* by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co., Chicago; and *"Nodular Iron vs. Section Size,"* by Gosta Vennerholm, H. Bogart and R. Melmoth, Ford Motor Co.

Concluding Gray Iron session will be sponsored jointly with the Steel Division Friday afternoon with papers by C. F. Walton, Case Institute of Technology, Cleveland, on *"Gating and Risering;"* and W. E. Johnson, W. O. Baker and W. S. Pellini, Naval Research Laboratory, on *"Principles of Gating."*

Steel

In addition to the above-mentioned joint session Friday afternoon with the Gray Iron Division, the Steel Division's program includes technical sessions on May 11 and 12, the Steel Round Table Luncheon, and joint sessions with the Gray Iron and Sand Division.

Opening Steel session the morning of May 10 will have three papers: *"Nature of Mold Cavity Gases,"* by Charles Locke, Armour Research Foundation, Chicago; *"Metal Penetrations in Steel Sand,"* by S. L. Gertsman, Canadian Bureau of Mines, Ottawa, Ont.; and *"Thermodynamic Study of Pinhole Formations in Steel Castings,"* by Howard F. Taylor, Massachusetts Institute of Technology, and R. E. Savage, International Nickel Co., New York.

May 11 session will have papers on *"Influence of Temperature on Fluidity and Surface Appearance of Steel Castings,"* by G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind.; and *"Steel Quality as Related to Test Bar Fractures,"* by H. H. Johnson and C. A. Fisher, National Malleable & Steel Castings Co., Sharon, Pa. Following this, at noon, May 11 will be the Steel Round Table Luncheon.

Friday's Steel program opens with a session featuring papers on *"Manganese Recovery in Acid Electric Steel Making,"* by S. F. Carter, American Cast Iron Pipe Co., Birmingham; and *"Metal Composition Tests for the Steel Melter,"* by H. H. Fairfield, Wm. Kennedy & Sons, Ltd., Owen Sound, Ont. Afternoon session will have Howard F. Taylor, Massachusetts Institute of Technology, and R. E. Savage, International Nickel Co., New York, speaking on *"The Fayalite Reaction in Sand Molds Used for Steel Castings;"* and H. F. Bishop, Naval Research Laboratory, Washington, D. C., speaking on *"Relation of Thermal Gradients to the Soundness of Cast Steel Plates."* Concluding session will be held jointly with the Gray Iron Division.

Pattern

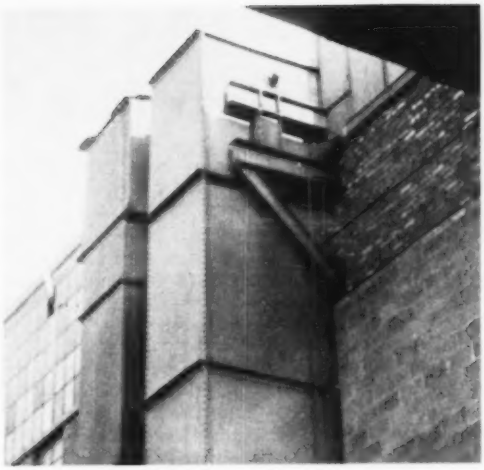
Opening the Pattern Division's program will be the Pattern Round Table Luncheon Wednesday, May 10. Speakers for the luncheon and technical sessions sponsored by the Division will be announced at a later date.

General Interest

Of broad interest to foundrymen will be convention sessions on Precision Investment Casting, Monday, May 8; Heat Transfer, May 9; Refractories, May 10; Management Functions and Controls, May 11; Time-study and Methods, May 11; Foundry Costs, May 11; and two sessions on Plant & Plant Equipment, Thursday afternoon, May 11, and Friday morning.

Left—The bucket elevator is located close to the railroad siding.

Right—View of the coke elevator at the charging-floor level. The first elevator installed, now obsolete, is shown on the left.



FOUNDRY COKE

from car to charging floor by bucket elevator

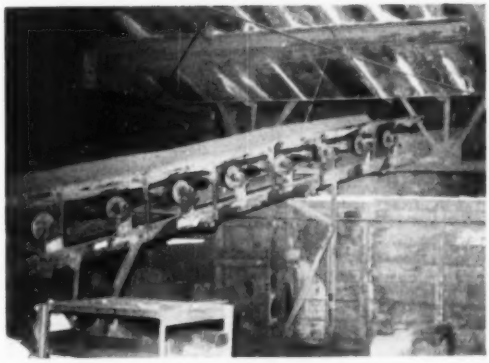
MANY FOUNDRIES are experiencing considerable breakage in handling "soft" coke and unloading space is also a problem for some plants (Letters to the Editor, September and November, 1949, issues of AMERICAN FOUNDRYMAN).

In response to these published communications W. A. Hallberg, chief metallurgist, Lakey Foundry & Machine Co., Muskegon, Mich., supplied the accompanying photographs and description of the installation which reduced the company's coke breakage to about five per cent.

For the company's cylinder foundry it is necessary to elevate the coke directly from cars on a railroad siding to storage bins on the charging floor. Accordingly, the bucket elevator shown was fabricated and installed. Substantially built, the unit—able to handle 80 to 100 tons in eight hours—has given good service for the past 3 years.

Coke is delivered in side drop-bottom cars which gravity feed the coke into the elevator hopper at ground level. The coke is elevated by the buckets to the charging level where it is discharged onto a belt conveyor leading to the storage bin.

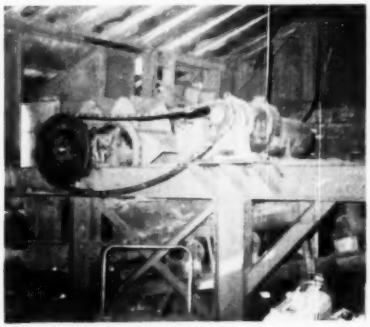
At the discharge end of the conveyor belt a cross-plate channel permits plowing off the coke to either side of the storage bin.



From the bucket elevator the coke is carried by belt conveyor to the storage bin on the charging floor.

At the discharge end of the belt a cross-plate plows the coke to either side of the bin. The cross-plate is double lined with belting to prevent coke breakage.

The coke elevator discharges onto a belt conveyor located under elevator drives.



EQUIPMENT FOR DEGASSING MAGNESIUM ALLOY MELTS

Alex J. Juroff, Foundry Metallurgist

Bendix Products Division
Bendix Aviation Corp.
South Bend, Ind.

IT HAS BEEN KNOWN for some time that the presence of dissolved gases in magnesium alloy melts is a strong contributory factor toward the formation of microporosity. Recent investigations by DeHaven, Davis, and Eastwood[1] as well as, Busk, Marande, and Newhams[2] have shown quite conclusively that hydrogen is the principal offender. These investigations have also shown that the removal of dissolved hydrogen with chlorine provides a reliable method of gas control. Eastwood, Davis, and DeHaven[3] discuss the mechanism of the chlorine treatment rather thoroughly.

Specific references to the equipment used in the degassing operation are rather brief, however. Eselgroth[4] has described apparatus used for gas reduction in aluminum and copper alloys using nitrogen as the flushing medium. The applicability of the Eselgroth equipment to magnesium alloys was not reported.

Degassing Apparatus Described

The purpose of this paper is to describe the constructional details and operation of suitable apparatus for performing the degassing operation on magnesium alloy foundry melts. The apparatus herein described was designed and developed for production operation by production personnel using conventional melting equipment.

Basic features of the equipment are shown in Fig. 2. The chlorine cylinder is rigidly mounted in a steel frame which rides on rubber tired casters as shown in Fig. 1. Suitable hangers are provided for the tube assembly when the unit is not in use. This arrangement provides a mobile unit that may serve as many superheating furnaces as the melting cycle permits.

Cylinder Clamp, Adapter Recommended

Referring to Fig 2, the auxiliary tank valve, *3*, may be joined directly to the chlorine cylinder. However, the use of a cylinder clamp and adapter is recommended.[5] The needle valve, *5*, should be secured to the framework by a clamp. This valve is used to make fine adjustments in gas flow while the unit is in operation. The hose, *7*, may vary in length to suit the operation, five to seven feet generally being sufficient. The lining of the hose must be neoprene, and double braid construction is preferred. The use of a quick opening valve, *8*, is optional—satisfactory operation can be obtained without it.

Since the pipe, *9*, carries the load of the graphite tube assembly, it should be of either heavy or extra heavy construction. It is advisable to provide some means of supporting the tube assembly while the unit is in operation. This may be done by welding a length of steel rod to the pipe, *9*, as shown in Fig. 2. This rod may then be drilled with a series of holes along its length. To place the unit in operating position, the rod is slipped into a tube welded to the furnace shell. Depth of the graphite tube assembly may then be adjusted by using a pin through the proper hole in the rod as shown in Fig. 1. The graphite tube should extend approximately two-thirds of the distance from the top of the melt to the bottom of the crucible.

For optimum results, the degassing operation should

Fig. 1—Adjustable bracket held by pin enables graphite tube carrying chlorine to be adjusted to proper depth.

be performed with the metal at a temperature of 1330 F to 1360 F. Below 1330 F, magnesium chloride is slow to form with the result that excessive chlorine escapes into the atmosphere. Burning on the melt surface tends to be excessive at temperatures below 1330 F. Apparently the magnesium chloride dissolves sufficient oxide to raise its melting point which reduces its fluidity and consequently its covering ability. Operation at temperatures in excess of 1360 F results in shorter tube life and in the formation of larger amounts of magnesium chloride.

Before degassing a melt, the graphite tube assembly should be thoroughly preheated. Valves *3* and *5* should

Preprint No. 50-42. This paper will be presented at an Aluminum and Magnesium Session of the 54th Annual Convention, American Foundrymen's Society, at Cleveland, May 8-12, 1950.

then be cracked and the tube positioned over the melt. Valve *1A* may then be opened and at the first sign of the yellow-green fumes at the tube tip the assembly is slipped into operating position. Coarse adjustments in gas flow may be made with valve 3 and fine adjustments with valve 5. Once adjusted these valves may be left in a set position. The chlorine flow should be adjusted to give a gentle boil to the melt with the bubbles approximately two inches high.

Care In Melting Cited

Care should be exercised that metal is not spilled over the sides of the crucible into the crucible setting. Five to eight minutes of chlorine treatment should be sufficient for a melt comprised of a clean dry charge Questionable or contaminated melts should be treated from 15 to 20 minutes. At the end of the degassing period, valve *1A* is closed and the tube quickly removed from the melt. With training and experience a single operator can perform the operation with ease.

Observations And Conclusions

Most frequent failures occur in the graphite tube assembly at the metal line. Tube life varies from 30 to 75 heats depending on usage, construction, care, and other variables. Hose life of 1000 heats is not uncommon if the hose is neoprene lined. Ordinary rubber will fail after two or three applications due to chlorination of the rubber.

On the basis of a seven minute cycle using a 130 lb capacity magnesium crucible, approximately 0.04 lb of chlorine per pound of metal is consumed. The metal loss due to the formation of $MgCl_2$ has not been quantitatively determined. Assuming, however, that the reaction

$$Mg + Cl_2 = MgCl_2$$

is 100 per cent complete, then, on the basis of 0.04 lb chlorine per pound of magnesium alloy, a maximum loss of 1.3 per cent may be expected.

Experience with the apparatus described has led the writer to the following conclusions:

1. Treatment of magnesium alloy melts in the foundry with chlorine supplements but does not replace good gating practice.
2. Properly executed, the chlorine treatment provides metal of more consistent fluidity from heat to heat. The variation in pouring time for a given mold is considerably reduced.
3. The operation is easier to perform and lends itself to better control than the older stirring method of refining.

References

1. James DeHaven, James A. Davis, and L. W. Eastwood, "Reduction of Microporosity in Magnesium Alloy Casting," AMERICAN FOUNDRYMAN, June, 1945, p. 44.
2. R. S. Busk, R. F. Marande, and W. C. Newhams, "Effect of Gas on the Properties of Magnesium Sand Casting Alloys," AMERICAN FOUNDRYMAN, May, 1945, p. 34.
3. L. W. Eastwood, James A. Davis, and James DeHaven, "Recent Developments in Magnesium Foundry Melts," *Light Metal Age*, February, 1946.
4. T. W. Eselgroth, "Nitrogen Degassing of Non-Ferrous Metals," *Metal Progress*, vol. 55, no. 6, June, 1949.
5. Pennsylvania Salt Mfg. Co. bulletin "Chlorine," 1941.

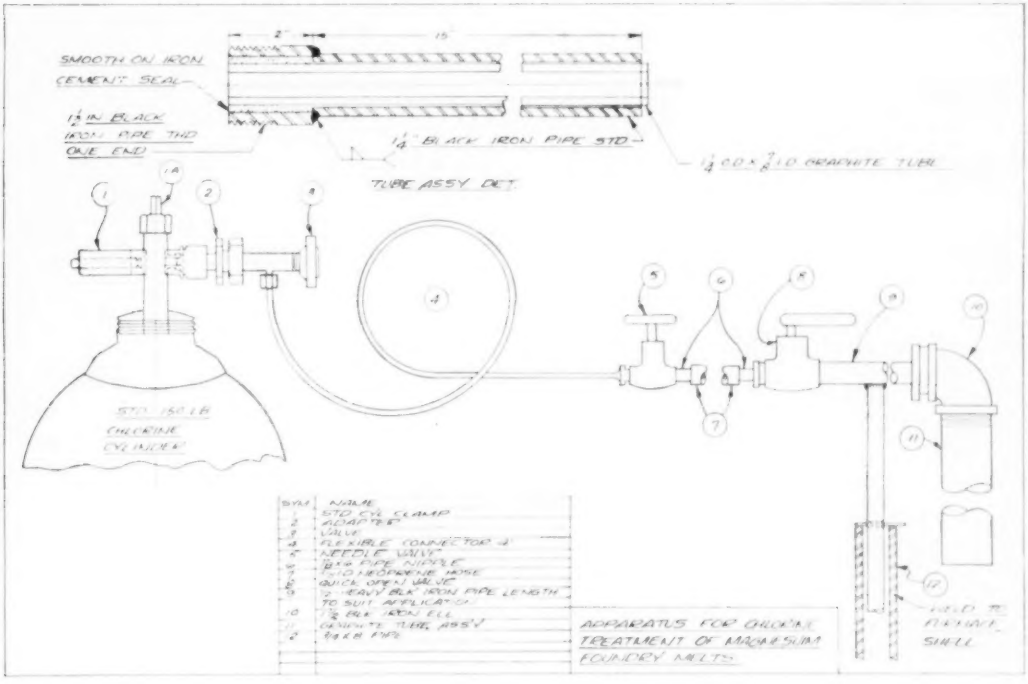


Fig. 2—Construction details of simple, effective chlorine degassing equipment for use in magnesium foundry.

BOARD OF DIRECTORS INITIATES LONG RANGE PROGRAM

Decision to develop American Foundrymen's Society plans and policies on a broader, longer range basis to promote progress of the Society and the foundry industry was made at the Board meeting January 27. National President E. W. Horlebein will appoint a Steering Committee to evaluate previous Board actions and lay the groundwork for policies and plans for major A.F.S. activities.

Discuss Plans and Policies

Other actions taken at the Board's meeting include:

—Approval of the recommendation by the Publications Committee "that a more aggressive program for increasing advertising in American Foundryman be worked out in order to make possible the publication of additional good editorial material in the Society's official publication."

—Acceptance of the recommendation of the re-activated Safety and Hygiene Committee for continuous revision of recommended good safety practices, for prosecution of an energetic education program to make foundrymen safety and hygiene conscious, and for a full time staff member as committee chairman.

—Discussion of plans for the International Foundry Congress to be held in the United States in 1952, and authorization for the president and the secretary to determine location with adequate facilities.

—Planning for a ten-year investigation and for financing of the Cupola Research program carried on since 1940 on behalf of the gray iron foundry industry.

—Acceptance of the semi-annual reports of the secretary-treasurer, and the technical director.

National President E. W. Horlebein presided at the meeting of the Board, and at the meeting of the Executive Committee the previous day. At both meetings were: Vice-President Walton L. Woody, National Malleable & Steel Castings Co., Cleveland; Past President W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh; F. C. Riecks, Ford Motor Co., Dearborn, Mich.; John M. Robb, Jr., Hickman, Williams & Co., Philadelphia; V. E. Zang, Unitcast Corp., Toledo, Ohio; Secretary-Treasurer Wm. W. Maloney; and Technical Director S. C. Massari.

National Directors also attending the Board meeting were: W. J. MacNeill, Dayton Malleable Iron Co., Dayton, Ohio; T. H. Benners, Jr., T. H. Benners & Co., Birmingham, Ala.; N. J. Dunbeck, Eastern Clay Products, Inc., Jackson, Ohio; Robert Gregg, Reliance Regulator Div., American Meter Co., Alhambra, Calif.; T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa.; L. C. Farquhar, Sr., American Steel Foundries, East St. Louis, Ill.; V. J. Sedlon, Master Pattern Co., Cleveland; F. G. Sefing, International Nickel Co., New York; and L. D. Wright, U. S. Radiator Co., Geneva, N. Y.

Following discussions by the Executive Committee on December 13, 1949, and January 26, the Board authorized National President Horlebein to initiate plans for the formulation of Board policies for future guidance of directors, staff, committees, and other foundry organizations. As a result of the tremendous growth of the Society's membership during the past 10 years, of its activities and their scope—the Board agreed—previously established policies should be reviewed in the light of present conditions and revised to permit longer range planning for the progress of the Society and the foundry industry. President Horlebein will announce a Steering Committee soon.

Renewed, organized safety and hygiene work in the industry has been under consideration by the National Castings Council which expressed the opinion that a program should be undertaken by the American Foundrymen's Society on behalf of the industry.

In noting that Secretary-Treasurer Maloney's report on membership showed a net loss of 6.2 per cent during the last half of 1949, the Board expressed confidence that with improved foundry operating conditions the Society would soon recover any membership loss sustained during the current fiscal year.

Continued development of the proposed Central Pennsylvania Chapter, and interest in formation of a chapter at Norfolk, Va., were reported by Maloney.

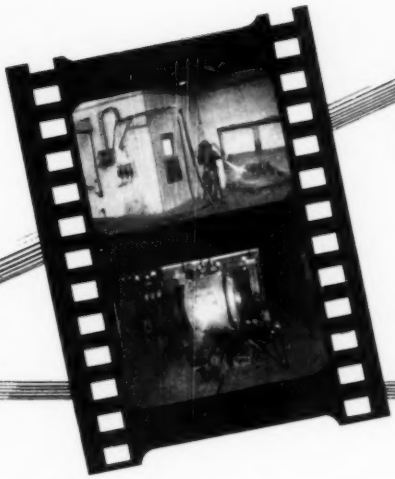
Report Increased Interest In Research

Technical Director Massari reported tremendous interest in the A.F.S. research program, particularly the movie, "*Fluid Flow in Transparent Molds*," covering the first year's work on the Aluminum & Magnesium Division's project. Production of a second film covering recent work was approved. Nine projects are currently operating and papers covering progress on a number of the investigations will be presented at the Convention.

A final report on the Malleable Division research project having been accepted, the Board authorized a new project—"A Study of the Effect of Melting Atmospheres on the Behavior of Malleable White Iron."

Publication activities of the Technical Department outlined by Massari include completion of: Transactions, vol. 57 (1949); Foundry Core Practice, a revision; Guide for Foreman Training Conferences; Bibliography of Centrifugal Casting; Foundry Apprentice Training Course Outlined; and College Research Projects.

Recent A.F.S. technical committees meetings—Steel Division Research, Gray Iron Research, Chill Test, and Educational Division Executive—will be reported in the April issue of American Foundryman.

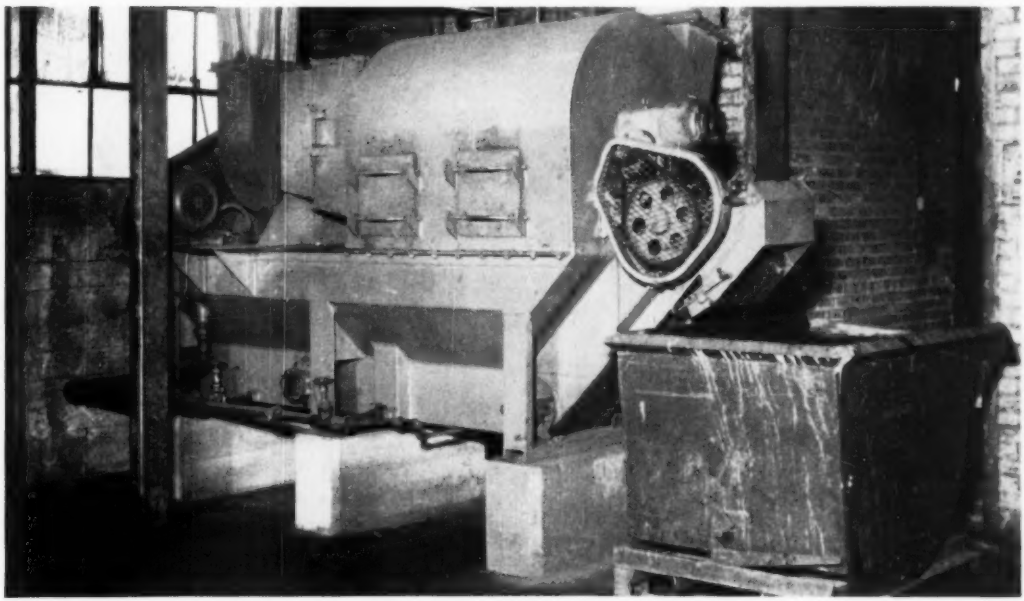


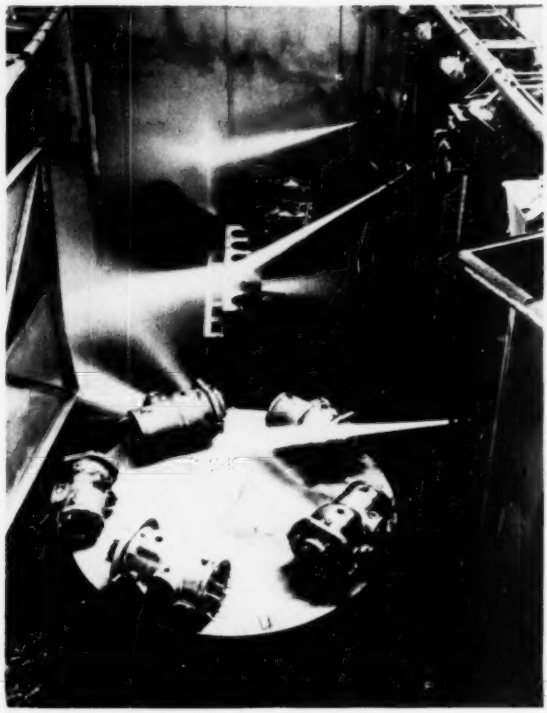
EXHIBITS Preview

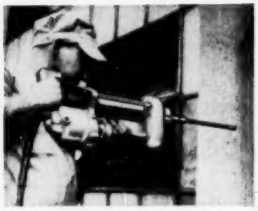
American Foundryman **herewith presents a preview of some of the foundry equipment, materials, and services to be exhibited at the 54th Annual Foundry Congress of the American Foundrymen's Society. Detailed information and a view of these and other products of the exhibitors can be obtained during the A.F.S. Show in the Cleveland Municipal Auditorium, May 8-12. Those unable to attend can request information on the coupon on Page 35. This is the second of three sections of Exhibits Preview. The first Exhibits Preview appeared in February. The third will appear in the April issue.**

12. Dust Suppression Demonstration

Whiting Corp.'s exhibit at the 54th A.F.S. Foundry Congress and Show will feature a full-scale model of the Whiting "CH" (Compact Horizontal) Hydro-Clone, designed to operate in low head-room areas. Housed in transparent plastic, the model will show how the Hydro-Clone reduces dust to easily-disposable sludge through the wet suppression method and at the same time absorbs fumes and gases often present in industrial dust.





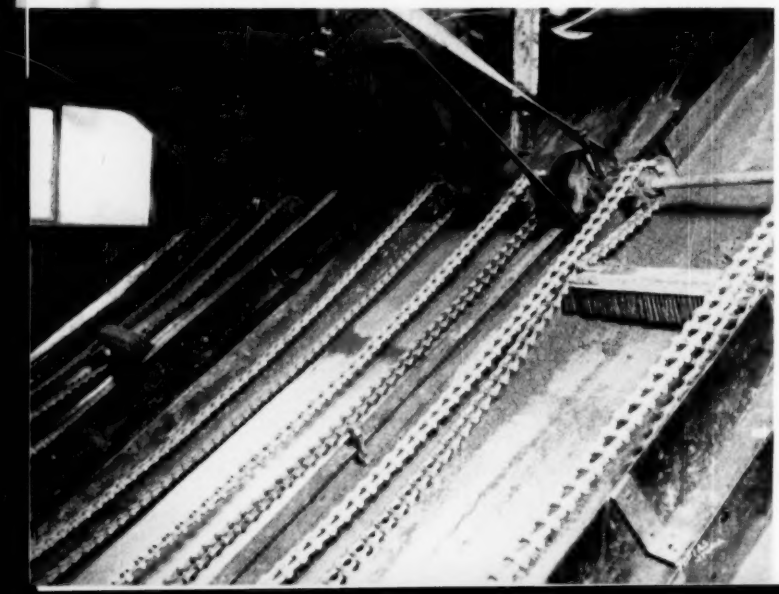


14. Rotating Electric Hammer Drill

Syntron Co.'s booth will feature the first electric hammer that both hammers and rotates the drill bit at the same time. The Model 25-RO Rotating Electric Hammer will drill up to 2 in. diameter holes, is of electromagnetic design with free-striking piston, has an automatic safety clutch on rotating drive that will slip if bit binds or sticks in hole, and permits percussive hammering to be stopped while bit continues to rotate. Weighing 38½ lb, Model 25-RO is available for either 110 or 220 volts.

13. Cleaning Room

Hydro-Blast Corp.'s exhibit will show an actual gun mechanism and controls of a new cleaning room whose three guns operate at 2,000 psi pressure and deliver an appropriate amount of sand in 75 gpm. Guns are actuated by external controls operated electrically and hydraulically. Also on exhibit at the 54th Foundry Congress and Show will be an illuminated flow diagram of Hydro-Blast's most recent development in reclamation of waste foundry sand.

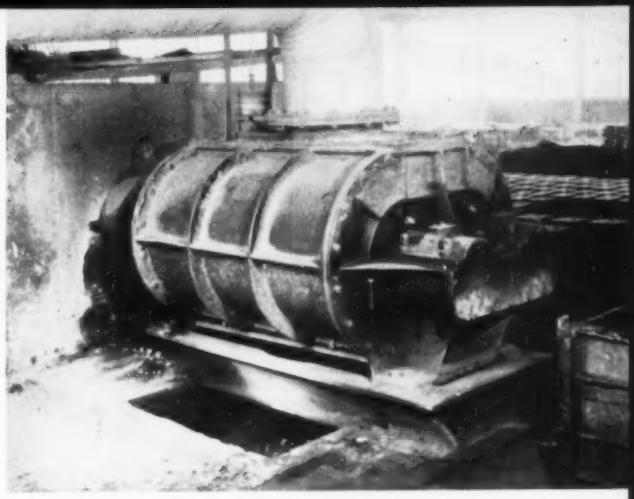


15. Foundry Sands

The joint exhibit of the Industrial Minerals Co. and the Zanesville Sand Co. at the 1950 A.F.S. Foundry Congress and Show will feature King-Bremen foundry sands which, as illustrated in photograph at left, are brushed through a battery of music wire screens. One brush works on top of each screen and three brushes underneath. Only sand which will pass these fine screens reaches customer.

16. Cupola Blowers

Roots-Connersville Blower Corp.'s exhibit will show both centrifugal and rotary positive blowers for cupola service. Bulletin 120-23-B11, covering both rotary positive type (illustrated) and centrifugal type blowers, will be distributed at the Roots-Connersville booth. Blowers manufactured by the company include 14 sizes of the rotary positive type, ranging from 640 to 13,900 cfm; and 11 sizes of the centrifugal type, covering capacities from 2,500 to 14,000 cfm at normal pressures.

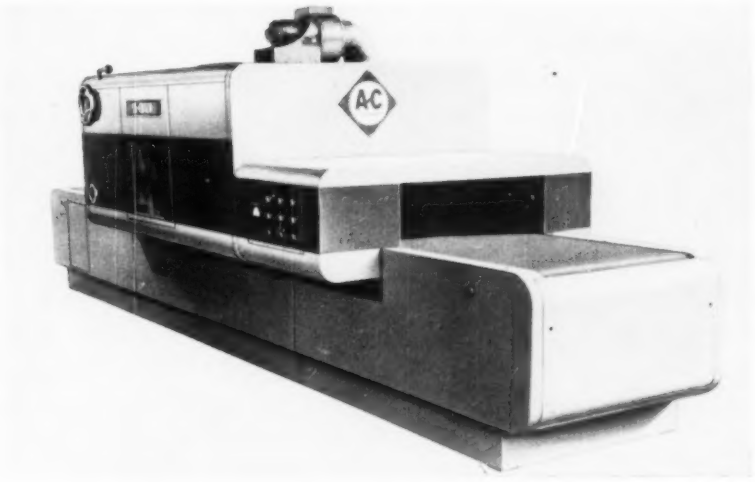


17. Clamshell Bucket

Blaw-Knox Co.'s new 1 cu yd single-line-on-hook type bucket for the handling of coke, coal, sand and small limestone will be on display at the 54th A.F.S. Foundry Congress and Show. Bucket is equipped with shark's teeth to overcome degradation in handling of coke, and has easily removable liner plates to adapt it to the handling of coal, sand and small limestone.

18. Sand Core Dryer

Feature of the Allis-Chalmers Mfg. Co.'s exhibit at the 1950 Foundry Congress and Show will be the Foundromatic Sand Core Dryer. Consisting of MM dielectric heater and oven, the Foundromatic permits production line operation in the foundry, cuts drying time from hours to minutes and reduces production and handling costs. A variety of core sizes and shapes can be handled simultaneously without danger of burning.



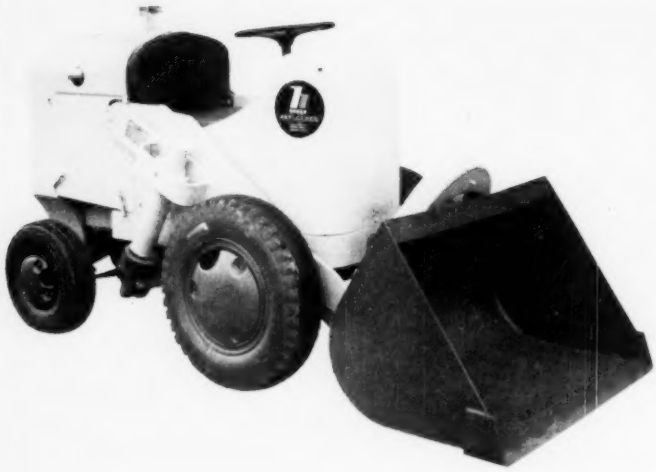
EXHIBITS Preview

19. Air Placement Lining Process

Eastern Clay Products, Inc. will demonstrate its new Bondact process for the fast mechanical ramming of refractory linings and patches. Shown at the exhibit will be the Bondactor, a pressurized machine which will meter and feed a dry refractory mixture at almost any desired rate or volume at any location convenient to air line or compressor. Unit feeds ganister, crushed brick, silica, sand or grog up to $\frac{3}{16}$ in. maximum size uniformly, and controls moisture content, thickness of lining and density of packing.

20. Laboratory Induction Furnace

Laboratory Equipment Corp.'s exhibit will feature a high frequency laboratory induction furnace, used in conjunction with carbon or sulphur determinator for rapid carbon and sulphur analysis of steel and cast irons. Furnace is ready for immediate operation at any time by flip of a switch.

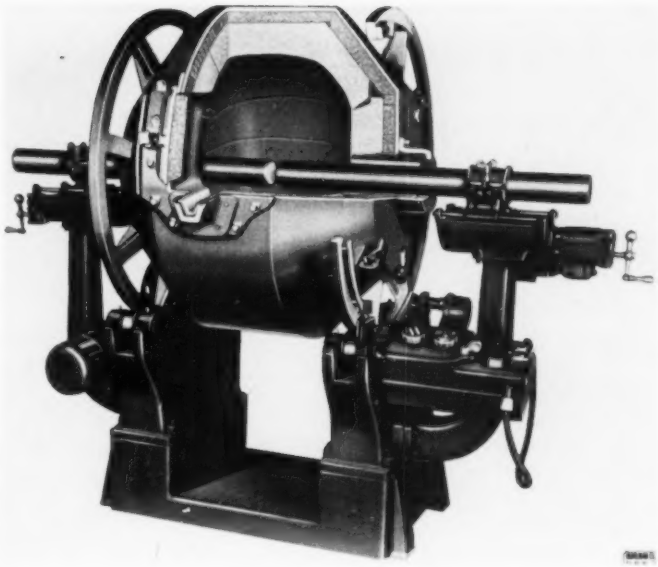


21. Materials Handler

Frank G. Hough Co.'s Payloader, to be exhibited at the 54th A.F.S. Foundry Congress and Show in Cleveland, will scoop up large bucket loads of any bulk material and carry it at speeds up to 16 mph over hard surfaces, ground or snow. The Payloader will dump into piles, trucks, bins, hoppers or containers and will dig, handle and rehandle earth and bulk materials, grade level, spot cars, push, pull and lift. The $10\frac{1}{2}$ cu ft model also loads and unloads boxcars. Other models are available up to $1\frac{1}{2}$ cu yd capacity.

22. Electric Rocking Furnace

Unusually versatile and adaptable is the Detroit Electric Rocking Furnace, to be shown at the exhibit of the Detroit Electric Furnace Div., Kuhlman Electric Co. Faster melts, rigid quality control and reduced costs are claimed for both ferrous and non-ferrous melting. Differing from other electric furnaces in that its electrodes remain clear of the bath at all times, the Detroit Electric Rocking Furnace eliminates possibility of carbon pickup, while rocking action constantly stirs bath to insure complete homogeneity. Cutaway of Type LFI furnace shows refractory lining and graphite electrode position for striking indirect arc.



23. Carbon Bonded Crucible

Joseph Dixon Crucible Co.'s exhibit at the 1950 A.F.S. Foundry Congress and Show will display the Carbond Crucible, a carbon-bonded crucible incorporating many new features. Constructed to meet rapid thermal shock, the Carbond Crucible heats faster because of its greater conductivity and is protected against oxidation in use by an active material that prevents attack and offers long service life under most severe melting conditions.

Exhibits Preview, AMERICAN FOUNDRYMAN, *616 S. Michigan Ave., Chicago 5, Ill.*

Please send manufacturers' literature on the Exhibits Preview items, indicated by circled numbers below, without cost or obligation to me.

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Foundrymen Meet In Birmingham

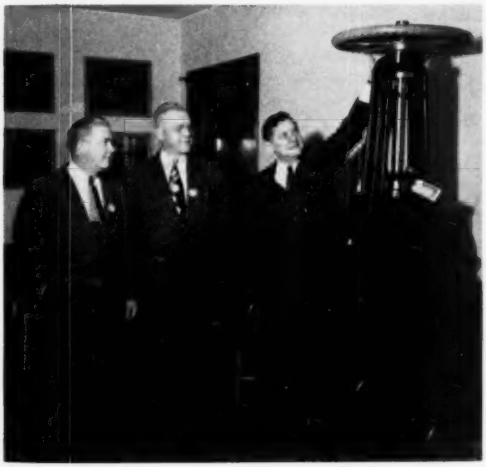
J. P. McClendon

Publicity Chairman
Birmingham District Chapter

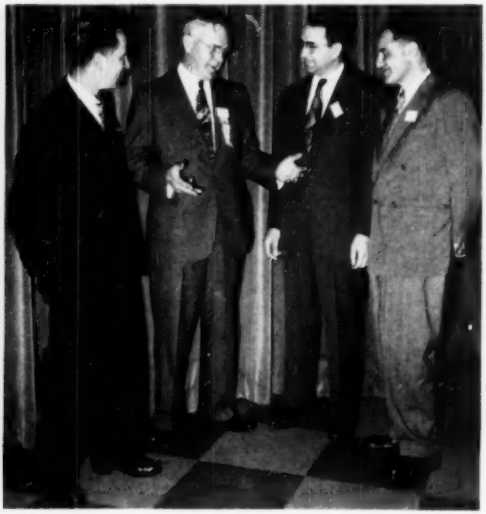
WITH REGISTRATION running well over 400 and all of the technical sessions well attended, the Birmingham District Chapter again provided a program of outstanding speakers, and foundrymen continued to show their interest in keeping up to date with foundry technology at the chapter's 18th regional foundry conference in Birmingham, February 2-4.

Carried out under the chairmanship of C. P. Caldwell, Caldwell Foundry & Machine Co., who heads the chapter, the program was planned by Chapter Vice-Chairman Morris L. Hawkins, Stockham Valves & Fittings, assisted by Joe T. Gilbert of the same company. Included on the program were five technical sessions, a luncheon, the conference banquet, an evening of entertainment, all at the Tutwiler Hotel, and visits to 24 plants in the Birmingham area.

Luncheon speakers the first day were National President E. W. Horlebein and National Secretary-Treasurer Wm. W. Maloney. Mr. Horlebein reminded his listeners of the contributions of foundries through the ages to the welfare of mankind and outlined the early history of the American Foundrymen's Society. Information in the hands of the Society is available



National Secretary-Treasurer Wm. W. Maloney and National President E. W. Horlebein (left to right) learn how huge cast iron valve works from Past President L. N. Shannon, Stockham Valves & Fittings. Among the 426 registered at the Birmingham Regional Foundry Conference were foundrymen from 15 states, Mexico, and Egypt. Below left, about to be shown through Stockham Valves & Fittings plant by Tom Lindsay are (left to right) Jose Cardonas Aquitra, Javier Lopez, and Jesus Vazquez Ramos, and D. L. Booker from Saltillo, Coah, Mexico. Below right, are O. J. Myers, Werner G. Smith Co., Minneapolis (starting left), National President E. W. Horlebein, Lyle L. Clark, Buick Motor Div., General Motors Corp., Flint, Mich., and B. Armenian, Egyptian foundry owner. Mr. Armenian joined A.F.S. through Donald C. Abbott, Birmingham District Chapter Membership Committee Chairman. Last photograph is provided through courtesy of Birmingham (Alabama) News.



freely to all, he said, in telling how A.F.S. has broken down the reluctance of foundrymen to exchange ideas.

Following the National President's discussion of the role of the National Officers and Directors in the management of the Society, Secretary-Treasurer Maloney spoke. He stated that 95 per cent of A.F.S. expenditures were directly for the development and dissemination of information to promote the art and science of production and use of metal castings. He outlined A.F.S. publication activities, pointing out that the Society now has some 35 special and periodical publications. Presiding at the luncheon was Chapter Vice-Chairman Hawkins.

At the opening technical session the morning of February 2, A. W. Gregg, Whiting Corp., Harvey, Ill., described some of h's experiences at the International Foundry Conference in Amsterdam last fall. He represented A.F.S. as an official delegate and presented a paper, *"Ferrous Foundry Melting Furnaces in the United States and Canada"* (AMERICAN FOUNDRYMAN, October, 1949, page 27). Following the international meeting his itinerary included visits to foundries in Holland, Belgium, Luxemburg, France, and England where Mr. Gregg said, there is no lack of technical ability or experience but a shortage of equipment.

Overlooking registration activities are (starting left): Donald C. Abbott, Hill & Griffith Co.; E. A. Brandler, Electro Metallurgical Div., Union Carbide & Carbon Corp.; Ray F. Frings, Harry G. Mouat Co.; and M. L. Carl, Sloss-Sheffield Steel & Iron Company.

European foundries have a higher proportion of apprentices than in the United States, declared Gregg, and have a greater interest in surface finish. They make extensive use of loam molding and cement molding. Chairman of the session was National Director T. H. Benners, Jr., T. H. Benners & Co.

After the opening day luncheon, the first technical session was on cupola operation with Lyle L. Clark, Buick Motor Div., General Motors Corp., Flint, Mich., speaking, and J. A. Bowers, American Cast Iron Pipe Co., as chairman.

Discussing cupola operating factors with emphasis on reducing costs, Mr. Clark described the special tumblers Buick uses to remove sand from gates, risers, and returns. Clean material going into the cupola, he said, cuts down slag, thus saving the loss of fuel wasted in melting slag and slag-forming materials.

Warren C. Jeffrey, University of Alabama foundry instructor (left), and S. D. Moxley, American Cast Iron Pipe Co., discuss the school's new foundry laboratory.

Buick cupolas operate on a ten to one coke ratio and silicon loss is held to a minimum to keep costs down. Importance of charging so that layers of coke and metal are uniformly thick was explained and illustrated by the speaker.

Harry W. Dietert, Harry W. Dietert Co., Detroit, spoke on *"A Paying Sand Control Program"* at the late afternoon technical session the first day. W. E. Jones, Stockham Valves & Fittings, was chairman.

Casting quality and cost improvement are possible with a specialized staff working on sand control, declared Mr. Dietert. He outlined control factors and stated that molding cost can be reduced with proper and standardized moisture, green strength, and sand toughness. In the core room, costs can be minimized by improving resistance to cracking, overhang, sagging, and sticking, with controlled blowability for cores which are blown, he said.

A program of entertainment ended the first day's round of meetings. Presiding was E. A. Brandler, Electro Metallurgical Div., Union Carbide & Carbon Corp., chairman of the Entertainment Committee.

Visit Birmingham-Area Plants

The morning of February 3 was devoted to plant visitations arranged under the chairmanship of Ray F. Frings, Harry G. Mouat Co. Arrangements for visitations for this morning and for the following full day were made at the registration desk through Mr. Frings and Joe T. Gilbert.

Technical sessions were resumed the afternoon of the second day with a talk on cores and core room practice by O. J. Myers, Werner G. Smith Co., Minneapolis. F. C. Coupland, American Cast Iron Pipe Co., presided.

With Past National President L. N. Shannon, Stockham Valves & Fittings, presiding, foundry education was discussed at the closing technical session. George K. Dreher, Foundry Educational Foundation, and Prof. E. C. Wright, University of Alabama, spoke on the Foundation program at the university and described courses and laboratory facilities available (AMERICAN FOUNDRYMAN, February, 1950, page 35).

Prof. E. C. Wright predicted that the FEF plan of providing scholarships and arranging summer foundry

Secretary-Treasurer Maloney, National President Horlebein, and C. P. Caldwell, Birmingham District Chapter chairman just before the pre-conference dinner.

work for students would spread outside the foundry industry. The plan has all the virtues but avoids most of the defects of the cooperative system of training, he declared.

S. D. Moxley, American Cast Iron Pipe Co., who spearheaded the drive for equipment and supplies for the new foundry at the University of Alabama announced the names of donors.

At the banquet that evening Ralph B. Draughon, president, Alabama Polytechnic Institute (Auburn), spoke on "*Pattern for Living.*" Chapter Chairman C. P. Caldwell presided at the banquet; Joe Woodward, Woodward Iron Co., was toastmaster.

In his talk Dr. Draughon said that the technical side of human existence has far overshadowed the human relations side. The tremendous rate of change in scientific development and industrial technology is good, he declared, if men throughout the world can adjust themselves to it.

Some 400,000 people in Alabama depend directly or indirectly on the foundry industry for a livelihood, Mr. Woodward stated, in introducing Dr. Draughon.

The Conference Registration Committee, under the chairmanship of M. L. Carl, Sloss Sheffield Steel & Iron Co., included: Jack Williams, Alabama By-Products Corp.; W. K. Bach, Foundry Service Co.; L. A. DeShazo; John F. Drenning, Kerchner, Marshall & Co.; James R. Reynolds, Hill & Griffith Co.; and William M. Schuler, Schuler Equipment Co.; all of Birmingham. Conference Secretary-Treasurer was Fred K. Brown, Adams, Rowe & Norman, Inc., who holds the same office in the chapter. Publicity chairman was J. P. McClendon, Stockham Valves & Fittings, reporter and photographer for the Birmingham District Chapter.

Entertainment Committee members, headed by E. A. Brandler, were: co-chairman, C. K. Donoho, American Cast Iron Pipe Co.; R. W. Sandelin, Stockham Valves & Fittings; E. M. Whelchel, Acipco; and W. Guy Bagley, Woodward Iron Co.

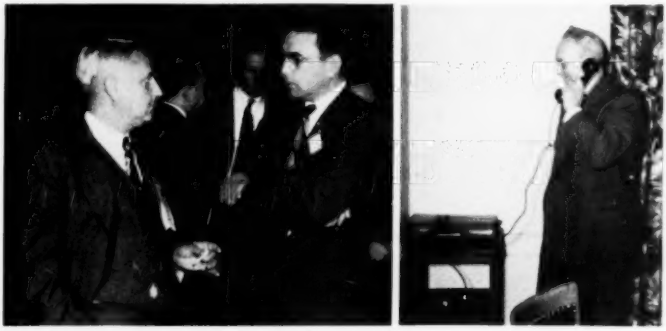
Open New University of Alabama Foundry

Two days before the Birmingham Regional Foundry Conference started, Southern foundrymen journeyed to the University of Alabama to witness the first heat in the school's new foundry. In cooperation with the foundry industry and manufacturers of equipment and supplies, the University and the Birmingham District Chapter planned and secured a building and foundry facilities believed second to none in the educational field. The new foundry is the first large scale educational operation in the South.

With University President John M. Gallalee looking on, Warren C. Jeffrey, foundry instructor, tapped the cupola and students poured molds for souvenir ash trays and mold weights under his supervision and the direction of Associate Professor Robert B. Oliver.

Prof. E. C. Wright, head of the department of metallurgical engineering, played host to visiting foundrymen. These included S. D. Moxley, American Cast Iron Pipe Co., who led the campaign to secure equipment; A.F.S. Past President L. N. Shannon, Stockham Valves & Fittings; George K. Dreher, Cleveland, executive director of the Foundry Educational Foundation; A. W. Gregg, Whiting Corp., Harvey, Ill., chairman of the A.F.S. Educational Division; and J. T. MacKenzie, Acipco, who took the lead in bringing FEF to the University of Alabama. The school was seventh to affiliate with the Foundation.

The program at Alabama is expected to be financed with funds solicited within the Southeastern area.



Comparing notes on cupola practice are J. T. MacKenzie, American Cast Iron Pipe Co., (left), and Lyle L. Clark, Buick Motor Div., General Motors Corp., Flint, Mich., conference speaker on cupola operation. At the telephone (far right) Fred K. Brown, Adams, Rowe & Norman, Inc., perennial secretary-treasurer of the Birmingham District Chapter and its regional foundry conference, handles some last minute details.

COST REDUCING MELTING SUGGESTIONS FROM THE A.F.S. HANDBOOK OF CUPOLA OPERATIONS

1. The melting of iron in the cupola is an art as well as a science.
2. Operations in each shop should be standardized.
3. The cupola manufacturer is always glad to co-operate with the foundryman in securing better cupola practice.
4. Clean walls are the first essential of good relining. Chip away all slag. Plug holes tight.
5. Patch the lining with splits or straights of standard quality or suitable refractory stone.
6. Never use river sand or molding sand in daubing mixtures. Use white silica sand or crushed fire brick, mixed with good fire clay.
7. Bottom sand should be open, strong, and mixed with as little water as practicable. Slope bottom toward taphole.
8. Good workmanship in making breast helps to get smooth operation and saves labor.
9. Put in kindling so that bed is ignited from the bottom over the entire area.
10. A properly made and burned bed is essential.
11. Coke to be used for the bed should be selected so that when the bed has been prepared, sufficient voids between the coke will be present to permit proper entry of the flame from oil burners, if such are used, or air in case wood is used for lighting.
12. Burn bed through evenly. Do not put all the coke in at one time. Level bed.
13. The height of the bed is extremely important and is good insurance to uniform subsequent operation. It is important to use a measuring stick to measure the height of the bed as originally charged, and again immediately before charging and after burning.
14. See that the proper amount of air for its capacity gets into the cupola.
15. Use properly installed volume and wind box pressure gages.
16. Maintain constant volume of blast during charging. Reducing the volume as the stock line descends will prevent the oxidation of the last iron and save the cupola lining. Automatic air-weight control automatically adjusts for this condition.
17. Excessive blast will quickly burn out the lining in the melting zone.
18. In charging, it is better to use uniform size stock and uniform weight of charges.
19. High-grade limestone—95 per cent or more $CaCO_3 + MgCO_3$—results in good slag with less slag volume.
20. A good pyrometer is better than the eye for measuring temperature.
21. Tapping is a simple and safe operation when the cupola is melting properly.
22. A short tap-hole, $2\frac{1}{2}$ to 3 in. front to rear, minimizes danger of freeze-up.
23. Open slag-hole when slag is up.
24. True melting rate is the total metal charged minus the weight of metal in the drop, divided by the melting time (melting time is elapsed time from blast on to blast off, deducting periods of shut-down during the heat).
25. Inspection of the drop is desirable. Examine proportions of charge, splashed iron, etc.
26. Careful charging saves the lining.
27. Bridging in the cupola will cause the lining to burn out in spots.
28. Steel flashings are hard on the brick lining.
29. Examine the slag each day. It will give much information on the operation of the cupola.

Take Off First Heat At University Of Alabama's New Foundry

Morris L. Hawkins, Stockham Valves & Fittings, stands on a roll conveyor to get a better view of pouring operations at the University of Alabama foundry's first heat. Taken off two days before the Birmingham Regional Foundry Conference, the heat celebrated the culmination of efforts of Southern foundrymen and the University to secure equipment and facilities for the school's new foundry. The new $70,000 laboratory and the first heat were viewed by a number of Birmingham District Chapter members, and by George Dreher, Foundry Educational Foundation, Cleveland. Alabama was the seventh school to affiliate itself with the Foundation.

MODERN FOUNDRY METHODS...

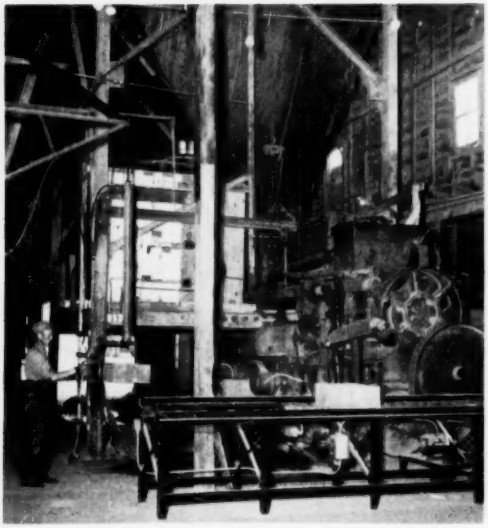
Briquetting Coke Breeze Cuts Melting Costs

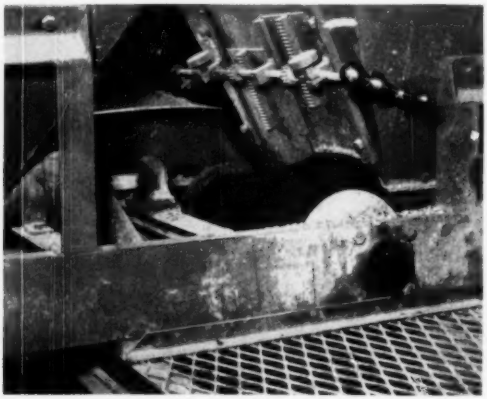
Since June 1948 when the foundry of Pontiac Motor Div., General Motors Corp., Pontiac, Mich., received its first 200 tons of coke briquets, the resourcefulness of the company's salvage department has saved and converted to use the foundry coke formerly lost as breeze and small pieces.

Amounting to about 10 per cent of the coke used, the salvaged fuel has saved tons of costly, scarce, high quality coke. A few months after the salvage operation was announced, AMERICAN FOUNDRYMAN reported the successful use of over 1000 tons of coke briquets in the Pontiac cupolas ("Burn Waste Coke in Cupola," November, 1948, page 59). This story gives further details and illustrates complete production of briquets.

Mixed with regular cupola coke, the briquets are used in proportions of 10 to 30 per cent of the total coke with 10 to 12 per cent being most common. Best results are obtained in continuous cupola operation at 15 to 30 oz blast pressure. The briquets do not work out efficiently when used in the bed or as extra coke for noon-hour shutdowns.

Strength of the briquets, which are bonded with Portland cement, improves with age and they are readily handled by hopper car (above) and by conveyor and



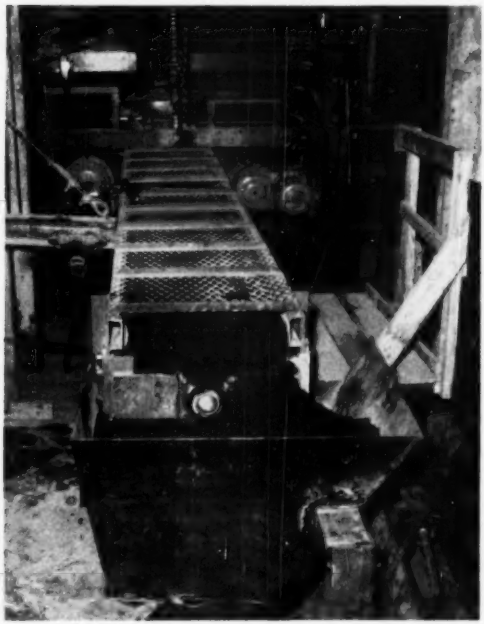


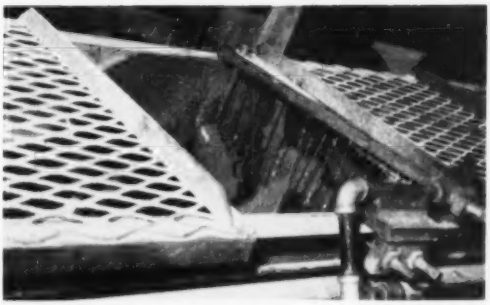
...MODERN FOUNDRY METHODS

charging equipment. Carbon content is 70 per cent.

The Pontiac coke briquets are produced in the builder supply plant of Boice Co., cross-town from the foundry. Coke dust and material passing a one-inch screen are delivered to the plant where the process begins with storage in an overhead bin.

From the bin (lower left, facing page), the coke passes through a crusher into a mixer where cement,



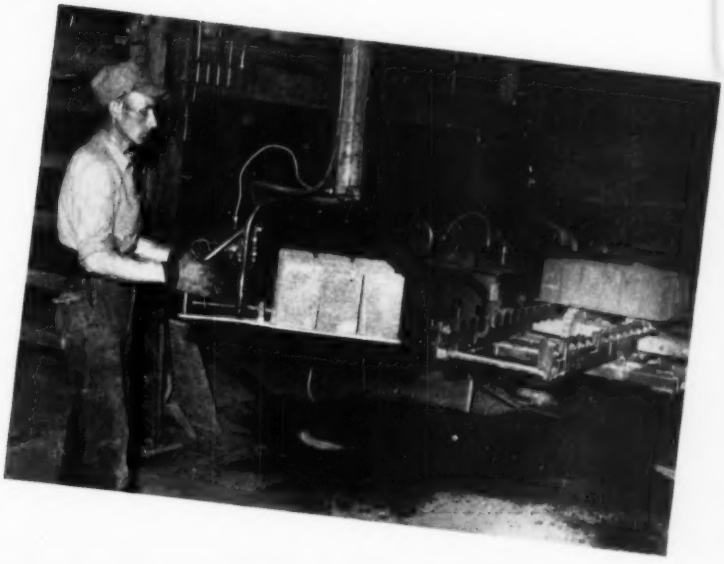


flux, and water are added, into molds, and finally to flanged-wheel rail cars which are used in the high pressure steam curing cylinders.

The crusher (lower right, facing page) reduces the larger pieces to ¼ in. Entering the mixer (background, left) the pulverized coke has added 1.3 to 2 cu ft of Portland cement for every cubic yard of breeze. One per cent lime is added, the mixture at this stage being five per cent binder and one per cent flux by volume.

Depending on the moisture in the coke, eight to 16 gallons of water per yard of coke breeze are added (above). When ready for briquetting the mixture must cling together under slight hand pressure, the test being performed in much the same way that hand tests of molding sands used to be done.

In open molds, the mixture is vibrated 10 to 15 seconds to form a dense but porous structure and to release the excess water. As they come out of the molds the briquets are removed from the short conveyor at the discharge end of the equipment (lower right) and transferred to another conveyor which starts the green briquets on the way to the final steps in production. Transferred to



Green briquets readily stand on end immediately after forming and withstand handling by air hoist, conveyor, and fork truck prior to curing under steam pressure.

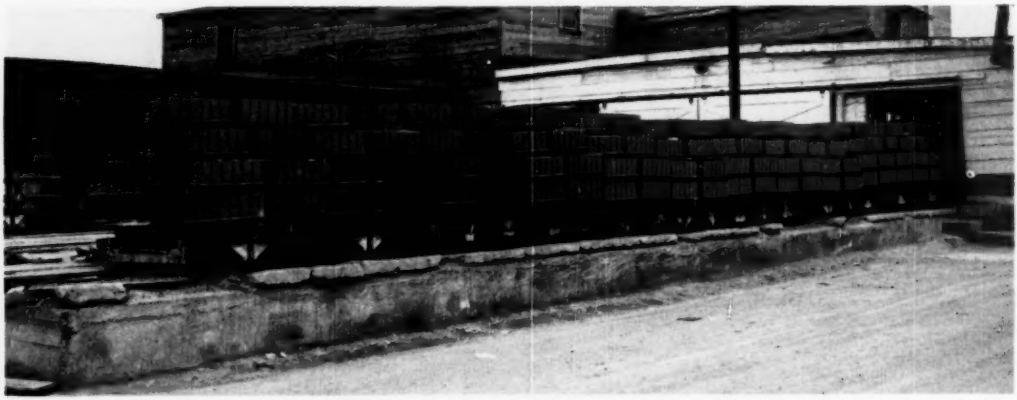
MODERN FOUNDRY METHODS...

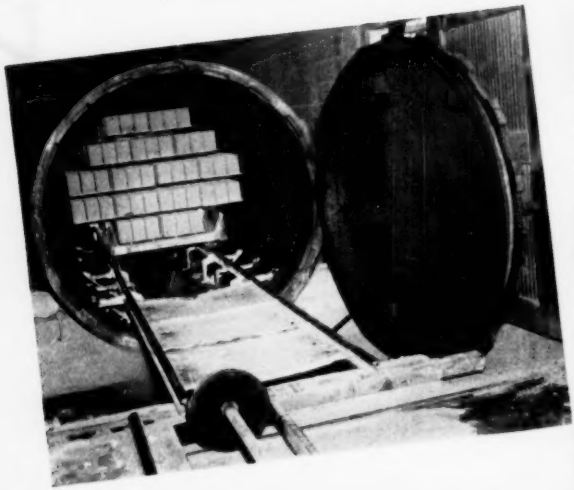
pallets, the briquets are moved to the stacking area by fork truck (right) where they are stored prior to curing.

Loaded on small cars, palleted and properly spaced, the green briquets ride the rails (below) to the steam curing cylinders where they are under steam pressure of 90 to 110 psi for four hours. Pressure is gradually reduced over a period of one half to one hour.

When first placed in the curing drums (below, left), the briquets have an initial setting period of two to three hours, otherwise they would crumble and shrink. Building up steam pressure takes another two or three hours, the entire cycle requiring about eight to 11 hours.

When cured the briquets are strong enough to withstand handling and will not disintegrate until they reach the melting zone in the cupolas. Loaded at the manufacturing point into hopper cars (below, right), the finished briquets are trained across town to the Pontiac Motor Div. foundry where they are dropped into an underground storage vault, ready for use in the cupolas. Briquets weigh 5 lb and measure $3\frac{1}{2}$ x $4\frac{3}{4}$ x $7\frac{3}{4}$ in.





FEF TECHNICAL AND UNIVERSITY ADVISORS HOLD COMBINED MEET

PRESENT AND FUTURE DEVELOPMENTS in the field of foundry education were the principal topics of discussion at a combined meeting of the Foundry Educational Foundation Technical and University Advisory Committees, held February 16 and 17 at the Hotel Cleveland, Cleveland, Ohio.

Outlined for the first time were a summary of the FEF's progress in engineering schools and recommendations for the Foundation's program during the coming years. One of the major items of discussion centered around engineering instruction at the University level. Classified as "general engineering interest," "specification, use and design," "engineering management," and "technical problems," phases of engineering education were demonstrated at the meeting by presentations of course and laboratory exercises.

The benefits that would accrue to the nation's economy through better understanding of the part that castings play in the fields of mining, agriculture, general manufacturing, transportation and housing were brought out in a session the afternoon of February 16. It was pointed out that engineering schools can stress the application of castings in the teaching of such subjects as metallography, machining, mechanical drawing, methods study and machine design.

It was shown that universities have aided the foundry industry by conducting seminars, cooperating in sponsoring technical conferences, and offering the use of their laboratories for foundry research work.

In addition to the textbook now being written by Prof. Peter E. Kyle of Cornell University under the sponsorship of the A.F.S. Educational Division, there are several others now in preparation, it was revealed at the Conference. Noteworthy among these is "*Fundamentals in the Production and Design of Castings*," by Prof. C. T. Marek of Purdue University, scheduled for publication sometime this month. Other texts in preparation are one written from the industrial engineering viewpoint by Prof. D. C. Williams of Ohio State University, and a volume on metals processing by Prof. Howard K. Taylor of the Massachusetts Institute of Technology. In addition, it was reported that the A.F.S. *Cast Metals Handbook* is now being revised.

Following this discussion, Dr. J. Elliott Janney of the firm of Rohrer, Hibler and Replogle spoke on "*Practical Personality Factors in a Business Organization.*" Discussion of Dr. Janney's talk by university personnel present led to a generalized listing of points to be considered in the selection and guidance of students seeking careers in the foundry industry.

Leaders in furthering the progress of engineering education for the foundry industry who met February 16 and 17 at the annual combined meeting of the Foundry Educational Foundation's technical and University Advisory Committees are pictured in this photograph. Represented are national metals technical and trade associations, foundries and foundry equipment manufacturers, and educators from the nation's leading engineering schools, colleges and universities.

At the Thursday evening dinner, members of the FEF Technical Advisory Committee summarized the technical and economic progress of their various groups. Following this, university faculty members discussed basic problems of the foundry industry as seen from the university angle. University personnel expressed the hope that the foundry industry will direct only technically qualified prospective students into FEF-sponsored engineering school programs.

A report on present active Foundry Educational Foundation scholarships was summarized as follows: University of Alabama, 12; Case Institute of Technology, 27; University of Cincinnati, 11; Cornell University, 26; Massachusetts Institute of Technology, 24; Northwestern University, 8; and the University of Wisconsin, 17. Total, 128. It was also shown that in addition to this group, a large number of students have voluntarily elected the program.

The meeting concluded with a review of policies of the Foundation, arrangement of a spring schedule of Industry Advisory Committee meetings and a discussion of financial arrangements.

RECOMMENDATIONS TO BUYERS OF CASTINGS

Cost Committee

THE REQUIREMENTS of increasing production, with its larger organizations and more highly developed degrees of specialization within both the using and producing organizations, have tended to emphasize the need for the highly beneficial mutual consultation of buyer and seller of castings. It is a tribute to industry in general that it has successfully been able to meet this need through the development of adequately trained personnel. Much of this progress can be attributed to the interchange of information made possible through our technical societies.

It has been aptly stated that production of a casting is a joint undertaking of the buyer and seller. This is true because the buying organization controls the design of the part to be produced and not infrequently supplies the patterns, flasks, inspection tools, or other important parts of the total production equipment.

It is evident that much of a foundry's ability to produce castings of high quality depends upon the design of the casting. Appropriately, there is an increasing trend toward mutual consultation of user and producer of castings in matters pertaining to design. Examples of the benefits of this practice accruing to buyer and seller alike—and to the consumer as well—abound in the minds of interested persons and in the literature.

Improved understanding of the producers' problems, on the part of designers, and greater skill in meeting design requirements by the foundry are the inevitable results of such collaboration. The buyer, by soliciting the foundry's cooperation in this respect, takes an important step in improving the quality of the castings he receives, in improving the price he has to pay, and in increasing the ultimate economy of his product to its user.

While design considerations bear an important relation to quality and price, it is equally true that the foundry organization needs complete descriptions of the equipment with which it is to work, and accurate information pertaining to delivery requirements in order effectively to plan balanced production schedules, and intelligently to compute a reasonable price for doing the work involved. Experience has proven the advantage to user and producer of firmly indicated schedules, calling for delivery not in advance of actual requirements, and of adequate descriptions of the existing equipment intended to be furnished by the buyer.

The type of cooperation implied by all of the foregoing can only result in higher quality castings for the using organization, produced and delivered at a lower cost and in less time than would otherwise be possible. In order to summarize and make reference easier, a check list of information to be supplied with an inquiry for casting prices, together with a suggested form of inquiry (below), is given.

Inquiries from buyers of castings should give the following essential information in order to facilitate receiving an accurate estimate based on the conditions involved in performing the work to be quoted upon.

I. Description of Casting Wanted.

A—Detailed Drawing showing actual or estimated weight of casting; dimensions; tolerances on impor-

REQUEST FOR CASTING QUOTATION

Material Specification: ..... Per Blue Print ..... attached
Wt. ea. Estimated ..... lb. Actual Please quote price per each in quantities of ..... (Part No.) .....
F.O.B. ..... for Delivery by .....
Pattern, Type:
Pattern is designed for castings to be made of ..... (Material) ..... and patternmaker's shrink of ..... inch per foot was used in its construction.
..... Loose, not gated, not suitable / suitable for mounting on plate.
..... Loose, gated, with ..... units per gate; approximate overall size .....
..... Wood, on board, with ..... units per board; for flask size .....
..... Match Plate, with ..... units per plate; for flask size .....
..... Cope & Drag, with ..... units on board; for flask size .....
The patterns mounted on plates or boards cannot / can be readily removed or remounted.
Pattern, Material: Pine, Mahogany, Aluminum ..... (Other) New / Old has run approx. ..... molds

Core	Cores Per Gang	Material of Boxes	Number of Boxes	Cores Per Box	Designed for Blower	Material of Dryers	Number of Dryers
A							
B							
C							
D							
E							

..... Total Cores per Casting

No pattern is available / temporary
Please quote on supplying production equipment for approximately ..... pieces.
Flasks: Quantity available ..... Type ..... Make .....
Size ..... Construction .....
Approximate annual requirement ..... pieces. Approximate quantity per order ..... pieces
These quantities are estimates for general guidance only. They may be changed without notice.
Radiographic / Magnaflux inspection by foundry is not required for random / all castings / is sample only.

Previous Difficulties: *Nature* *Location*

Remarks:

tant casting dimensions; machined surfaces and amount of finish to be allowed; any required finish other than commercial cleaning; locations for part number, trade marks, or other symbols; whether raised or sunken symbols are preferred; heat treatment required, if any; description of service or use if this be in any way likely to require unusual foundry practices; first operation locating points and kind of metal (as outlined in Paragraph C, following).

B—Sample Casting: If at all possible, a sample casting should be supplied for estimating purposes. The sample can be a scrap casting, and in any event it should not necessarily be intended as an example of the quality of casting expected.

C—Kind of Metal including chemical composition, physical properties with permissible variations in these, or reference to a specification, preferably American Society for Testing Materials, to be met. For gray iron castings it is undersirable to specify both chemical composition and definite physical properties unless these be made to conform with the practice of a particular foundry, and are not intended to be reproduced in another.

It is recommended, therefore, that a relatively liberal range of chemistry be specified when definite physical properties are wanted in gray iron. If non ferrous, state whether virgin, remelt or secondary metal is to be used. If tests, such as pressure tests, be required they should be described and the method of testing given.

State where and by whom tests are to be made. Should test bars be required by the customer, or for certification of properties by the foundry, the inquiry should give all details relating to such bars, or certification.

D—Additional operations, not described in material specifications or on blueprint: Any unusual operations required, such as painting, japanning, galvanizing, enameling, polishing, Sherardizing, Parkerizing, or pickling or special cleaning as a preparation for these or other surface treatments; or any machining operations should be specified. Location of possible interference with tooling or in assembling at user's plant should be indicated. If inspection of castings at foundry regularly by representatives of buyer or of other interested organizations be required, this fact should be stated. If radiograph or magnetic particle inspection be required the areas to be so inspected should be defined preferably in the blueprint. State also if such inspection be required on sample, random castings, or all castings.

E—Previous Experience: If any difficulties have been encountered with the casting, their type, location, and frequency should be given.

II. Equipment.

An adequate description of available pattern equipment should be given including:

1. Type of pattern.

Loose (number of patterns, and if suitable for mounting on plate).

Gated (number on gate and overall dimensions).

Mounted on plate (number of plate, size of plate, and whether patterns and gates are removable).

Machine, cope and drag (number on equipment, size of board, and whether or not patterns and gating are removable).

2. Material of pattern.

Wood (hard or soft, metal reinforced).

Metal (state kind).

Other materials.

3. Number of cores per casting, with description of core boxes.

Number of cores per core box.

Material from which core box is made.

Whether or not designed for core blower.

Number, kind, and material of dryers.

4. Metal for which pattern was originally made, and patternmakers' shrink used in its construction.

5. Approximate age, in molds made, and condition of existing pattern.

6. If no pattern be available, state:

Whether or not foundry is to make pattern.

If a separate shop is to make the pattern, the producing foundry should be given an opportunity to suggest how pattern should be made.

7. If buyer is to furnish flasks, the quantity available, along with size, type, make, and construction should be given.

III. Quantity Required.

Give quantity to be quoted upon, and delivery schedule not in advance of actual requirements. State approximate quantity which will be accepted over or under ordered quantity. State if shipments will be accepted in advance of schedule. Knowledge of the approximate yearly requirement is helpful but not necessary.

IV. Packing, Marking.

If inquiry be directed to a foundry not familiar with buyer's requirements affecting packing and marking of castings, then the details of these requirements should be described.

V. Price

State whether price is wanted per piece, per pound, or by the lot; and the f.o.b. point to be used in quoting.

***Recommendations to Buyers of Castings*, A.F.S. Booklet No. 43-45, is widely used by foundrymen for providing their customers with mutually helpful information on the purchasing of castings.**

Foundry Cost Committee Personnel

The 1949-50 members of the A.F.S. Foundry Cost Committee are: Ralph L. Lee, Chairman, Grede Foundries, Inc., Milwaukee; George E. Tisdale, Secretary, Zenith Foundry Co., Milwaukee; C. R. Culling, Carondelet Foundry Co., St. Louis; C. S. Roberts, Dodge Steel Co., Philadelphia; N. J. Schmidt, Gunite Foundries Corp., Rockford, Ill.; J. A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.; and C. E. Westover, Westover Engineers, Milwaukee.

In 1931 the A.F.S. Cost Committee approved a set of Recommendations to Buyers of Castings, developed by its subcommittee consisting of: Robert E. Belt, Chairman (Representing Malleable Branch); W. J. Corbett (Representing Steel Branch); Chas. Seelbach

(Representing Gray Iron Foundry Branch), Forest City Foundries, Cleveland; Jas. L. Wick, Jr. (Representing Non-Ferrous Branch), Falcon Bronze Co., Youngstown, Ohio.

In 1942 the Cost Committee requested a subcommittee to go over the material of the 1931 report and suggest, if deemed necessary, revisions of the 1931 report of recommendations to buyers of castings. This subcommittee reported the results of the survey and, upon approval by the Cost Committee and the Society, these recommendations were published in A.F.S. Booklet 13-15 for the benefit of the industry.

The personnel of the A.F.S. Cost Committee presenting these recommendations included: R. L. Lee, Chairman, Grede Foundries, Inc., Milwaukee; E. W. Horlebein, Vice-Chairman (Representing Non-Ferrous Founders' Society), Gibson & Kirk Co., Baltimore, Md. (current President of A.F.S.); Robert E. Belt (Representing Malleable Founders' Society); John L. Carter (Representing Gray Iron Founders' Society), Newark, N. J.; R. L. Collier (Representing Steel Founders' Society), Steel Founders' Society of America, Cleveland; C. A. Davis (Representing A.F.S. Gray Iron Division), Caterpillar Tractor Co., Peoria, Ill.; C. S. Roberts (Representing Steel Founders' Society), Dodge Steel Co., Philadelphia; and J. A. Wagner (Representing Malleable Division), Wagner Malleable Iron Co., Decatur, Ill.

Future Meetings and Exhibits

STEEL FOUNDERS' SOCIETY OF AMERICA, annual meeting, Edgewater Beach Hotel, Chicago—Mar. 21-22.

MALLEABLE FOUNDERS' SOCIETY, market development conference, Technological Institute, Northwestern University, Evanston, Ill.—March 22-23.

METROPOLITAN BRASS FOUNDERS' ASSOCIATION, 40th anniversary party, Hotel New Yorker, New York—March 24.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, annual conference, St. Louis—Apr. 4-7.

AMERICAN SOCIETY OF TOOL ENGINEERS, Philadelphia—Apr. 10-14.

METAL POWDER ASSOCIATION, annual metal powder show, Detroit—April 25-26.

54th Annual Foundry Congress and Exhibit, American Foundrymen's Society, Public Auditorium, Cleveland, May 8-12.

ELECTRIC METAL MAKERS GUILD, annual meeting, Shawnee Hotel, Springfield, Ohio—June 1-3.

INSTITUTE OF BRITISH FOUNDRYMEN, 47th annual conference, Buxton, England—June 6-9.

AMERICAN ELECTROPLATERS' SOCIETY, fourth international electrodeposition conference, Statler Hotel, Boston—June 12-16.

MALLEABLE FOUNDERS' SOCIETY, annual meeting, The Homestead, Hot Springs, Va.—June 22-23.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting and exhibition, Haddon Hall, Atlantic City, N. J.—June 26-30.

STEEL FOUNDERS' SOCIETY, annual fall meeting, The Homestead, Hot Springs, Va.—Sept. 25-26.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, annual meeting, The Greenbrier, White Sulphur Springs, West Virginia—Oct. 12-14.

GRAY IRON FOUNDERS' SOCIETY, annual meeting, Netherland Plaza Hotel, Cincinnati—Oct. 19-20.

AMERICAN SOCIETY FOR METALS, national metal exposition and Congress, International Amphitheater, Chicago—Oct. 23-27.

A.F.S. Director A. M. Fulton and Past National Vice-President Janssen Die

A. M. Fulton

DEATHS OF TWO MEN who have long been prominent in affairs of the American Foundrymen's Society occurred recently—that of A.F.S. National Director Alfred M. Fulton on February 15 at Miller Hospital, St. Paul, Minn., and that of A.F.S. Past National Director (1916-18) and Vice-President (1919) Walter A. Janssen on December 18 in Washington, D. C.

Mr. Fulton, who was vice-president of the Northern Malleable Iron Co., St. Paul, had been active in the American Foundrymen's Society for many years, serving as chairman of the A.F.S. Malleable Division for two years, and as a National Director of the Society since 1948. Mr. Fulton was at one time chairman of the A.F.S. Twin City Chapter and had been with Northern Malleable Iron Co. since 1920, when he came to St. Paul from the Fort Pitt Malleable Iron Co., Pittsburgh. He is survived by his widow and three children—Dr. Alfred M. Fulton, Jr., of Billings, Mont.; Martha Fulton of Evanston, Ill.; and Donald B. Fulton, employee of the Dayton Malleable Iron Co., Dayton, Ohio.

Walter A. Janssen, who since 1938 had been with the U. S. Department of Commerce, Washington, D. C., as a consultant on metals and minerals, served as a National Director of the American Foundrymen's Society from 1916 through 1918 and as National Vice-President in 1919. A graduate of the University of Wisconsin, Mr. Janssen began his career with the Steel Foundry Division of the Bettendorf Co., Bettendorf, Iowa, in 1917. Among executive positions held by Mr. Janssen in the foundry industry were: operating vice-president of American Steel Foundries, Chicago; president of Cardinal Laboratories, Chicago; metallurgical consultant, Pittsburgh; and general manager of the International Vanadium Corp., Moab, Utah. In 1933, Mr. Janssen became deputy administrator for the National Recovery Administration, in charge of codes pertinent to the metals industries. From 1936 to 1938, Mr. Janssen had his own consulting business on economic technical management and market research in the metals field. Since 1938 he has been with the Department of Commerce.

N.E. Ohio Chapter Publishes Roster

NEWLY-PUBLISHED is the A.F.S. Northeastern Ohio Chapter's roster of members. Pocket sized, the 68-page paperbound booklet contains names and company affiliations of all chapter members, classified by members' names and by companies, a roster of officers and committee personnel, and listings of past chapter presidents, honorary life members, company and sustaining memberships.

PLANNING FOUNDRY PREVENTATIVE MAINTENANCE

Thomas F. Butler
Plant Engr., Foundry
Ford Motor Co.
Dearborn, Mich.

CONSIDERATION OF FOUNDRY MAINTENANCE must start with the plant layout. Good equipment alone is not sufficient for continuous economical production. It must be kept in running condition.

If the equipment is to receive proper maintenance it must be accessible. Each piece of equipment must have sufficient room for repairs to be made in the shortest possible time. Installation of a monorail for chain-falls over any piece of equipment is a good investment. An aisle between each molding unit is definitely not a waste of space. Any equipment under the floor should be located in pits of ample size, well lighted and ventilated, or in a basement extending under a large portion of the foundry. Pits and basement should be kept dry and clean.

All conveyors must be accessible for oiling and inspection. One-shot lubrication, while it has its merits, sometimes leaves something to be desired, as the oiler does not see the operation. However, automatic lubrication has a definite advantage in many cases. A conveyor trolley that can be greased or oiled mechanically will certainly get more lubrication than it will by hand greasing. A crane will be more uniformly lubricated mechanically.

High Temperature Lubrication

Conveyors passing through high-temperature zones require special attention. Considerable trouble was experienced with a recent installation of horizontal core baking ovens when the temperature was increased and the conveyor speeded up to meet production requirements. A proprietary compound was found to stand up under temperatures well above 550 F. Graphite mixed with kerosene or any carrying medium gave satisfaction in temperatures up to 480 F.

It is difficult to remove all the dirt from a fitting when greasing equipment. Any dirt that is carried in with the grease is most certainly destructive to the bearings. Perhaps a sealed-for-life bearing is the answer.

Foundry equipment should be substantially built. Jolt and squeeze machines, sand slingers, shakeout machines, etc., operate under severe conditions. The factor of safety used for machine shop or assembly plant equipment is not sufficient for equipment which must withstand the rigors of foundry production. Molding sand is abrasive—sprues and risers are jagged—hot metal is destructive—all demanding a degree of equipment maintenance that is not approached in the ordinary course of manufacture.

Foundry cleanliness starts with the collection of smoke, gas and dust at the sources, and proper disposition after collection. Properly designed hoods are of prime importance, and the dust collector should be selected for the particular job.

One of the most efficient all-round dust collectors is the electric precipitator. The less expensive centrifugal type dry collector does a good job on the heavier particles. Cloth type collectors should not be used where there is possibility of fire. Several good wet type collectors covering a wide range of requirements are available. Some advantages of the water type collector are a minimum fire hazard and the fact that dust once collected does not spread again.

Everything In Its Place

Scrap metal, sand, bonding materials and the like should be kept in their proper places. Sand should be removed from the sprues and risers before they are returned to the charging floors. Smoke and fume should be collected at the tops of the cupolas before they are discharged into the air to settle on the roof and surrounding territory. Windows in raised portions of the roof should be vertical. The frames of slanting windows oxidize and are difficult to keep clean and in good condition.

A well-lighted shop light is a great help to production. Lighted areas will be kept clean. Any space that is worth a roof is worth lighting. An average of 20 foot-candle per square foot of floor space should provide good lighting. Basements, storage rooms and other non-production locations should have 15 foot-candle per square foot. Core setting and fitting need 35, and 20 should be sufficient for the rest of the foundry.

Allowing equipment to run until it breaks down, and then sending the production men home while it is being repaired is certainly a poor policy. The plant loses production; the men lose their wages.

How can we prevent this condition? Continual watchfulness is the answer—inspection of all equipment at stated periods—reports (see sample form below) made and read by competent men. Inspection reports

No. 6 Unit Weekly Check Sheet

	Condition	Date Overhaul	Date New	Remarks
I. Sand handling equipment				
1. Sandslinger				
A. Ramming head hsg.				
B. Liner adj. screw and pins				
C. Liner tip bolt				

NOTE: The actual check sheet, from which this brief illustration is taken, covers some 140 parts of the sand handling and shakeout equipment.

NOTE: This paper was presented at the March 17, 1949, meeting of the A.F.S. Detroit Chapter.

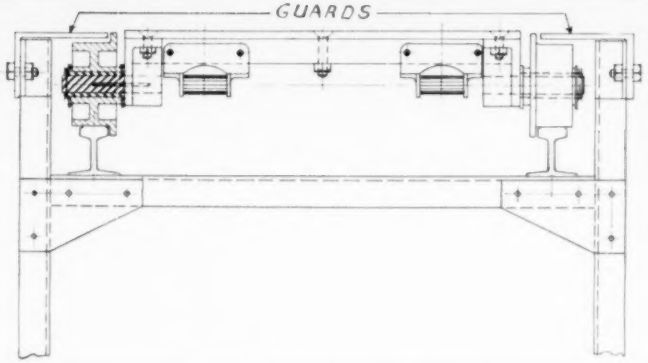


Fig. 1—Guards and the apron of the conveyor protect the flanged wheels, bearings, and rails of this slat conveyor. Wheels are easily replaced because they are separate from chain and are readily accessible.

which are merely "rubber stamps" to be filed away without action are worse than useless.

Preventive maintenance is just as big a problem in the small foundry as in the large one. A list of all equipment to be checked, with columns for good, poor, and critical condition, that the inspector must sign and date will give an accurate report which can be checked with the down-time report. By acting upon the report of the checker, and repairing or replacing equipment before an actual breakdown occurs, much down-time will be avoided.

In a large foundry the superintendent can see only a small part of the equipment in a month. Therefore, the maintenance supervision has the responsibility of assuring continuous operation. This embraces running repairs and the same anticipatory maintenance as in the small foundry. An added responsibility should be considered—the selection of new equipment from a maintenance standpoint. The maintenance supervision should have the drawings of all proposed equipment for inspection and approval.

The basis of good maintenance in any foundry is the lubrication inspector. He should be responsible for reports on equipment condition and the probability of failure. From the reports of these men the supervision can provide anticipatory maintenance. The inspectors and their supervisors are responsible for keeping the shop running. Production men seldom are good critics of the condition of the machinery in their departments.

A record of all breakdowns in an inspector's territory (form below) is an incentive to good inspection. So is a

Maintenance—Millwright

Date ..... Shift No.....	Reason	Prod. lost	Minutes	Men aff.	Man min lost
M-1 System down 6:30 - 7:55	Valve broken off on 7HA-6325 drag	yes	25	8	200
H-2 System down 1:00 - 1:06	Broken nipple on 8A drag	yes	6	1	21
No. 1 Core Room					
No. 2 Spinner down 9:28 - 10:00	Bolts sheared off drive	yes	32	11	352

cost sheet of his repair expenses. Let the man know that management is aware of how well he is doing his job and he will take pride in doing it better. If he is not doing well an explanation of the difficulty may help him. If breakdowns occur often in one spot an engineer should be assigned to analyze the cause and to recommend, even develop, corrective measures.

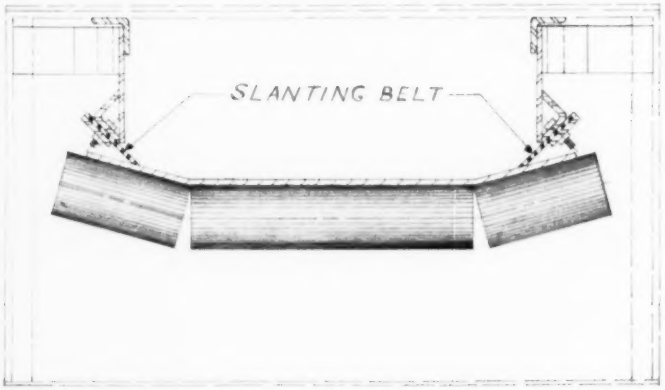


Fig. 2—Use of slanting belt instead of vertical guard results in less wear on conveyor belt and minimizes possibility of lumpy or jagged material wedging between belt and slanting guard.

Frequent minor jobs will be required during production. Major repairs for the most part can be anticipated and cared for outside of production hours. General overhauling should be done as needed during periods of slack production or shutdown.

Replacement and repair parts should be accessible to the maintenance department from a conveniently located crib. A repair parts list kept by a competent man is a "must." That man must be able to anticipate requirements and stock the parts in advance. Here again we must go back to the original planning of a foundry. Standardization is essential. We can not completely standardize, as that would tend to stop development and progress, but we do not need a different size or make of shakeout or molding machine for every job.

Pose Frequent Maintenance Problems

In laying out a foundry it is wise to consider the number of jobs one spare piece of equipment can cover. Spare parts requirements should be kept to a minimum, taking care to cover the necessary items.

In the following list are several items of foundry equipment which frequently present maintenance problems. In some cases it was possible to apply preventive maintenance measures by redesigning parts of the equipment.

Drives—Couplings not properly lined up. Supports not rigid.

Elevators—Excessive wear. Chain breakage or belt slippage. Install clean out doors at bottoms, with ample room for workmen.

High-Speed blowers—Good foundations are necessary, as is good lubrication. Be sure that blowers are properly lined up on sturdy baseplates.

Slat conveyors—Design conveyors with chains separated from supporting wheels for easy replacement of wheels (Fig. 1).

Dust conveying after collection—Do not spread the dust after collection. Keep it in closed containers and remove it properly.

Belt conveyors—Slanting belt attached to hopper, replacing the metal vertical guard (Fig. 2).

In organizing maintenance crews the first need is for good mechanics—men with a desire to tackle tough problems and not afraid to work. But with this we need experience. There is no substitute for experience in a maintenance department. Men who have come up as millwrights usually make the best maintenance foremen because they learned by experience.

Issue Final Apprentice Contest Instructions, Prepare For Judging

SPONSORS OF ENTRANTS in the 1950 A.F.S. Apprentice Contest which closed March 10 are urged to make early plans for mailing Certification of Entry forms, patterns, and castings. A number of chapter and plant contests have been completed and some local prizes have already been awarded (see below). All local contests are expected to be completed soon.

Certification of Entry forms and instructions for shipping patterns and castings have gone to all sponsors of apprentices or to chapter educational committee chairmen. Certification forms, properly filled in, should be sent to Jos. E. Foster, technical assistant, American Foundrymen's Society, at the Society's new address—616 South Michigan Ave., Chicago 5, Ill.—in time to arrive by April 1.

Contestant's patterns and castings, appropriately identified with tags provided by the A.F.S. National Office should be sent—express prepaid—to the following address where judging will occur: Cleveland Trade School, 535 Eagle Ave., Cleveland, Ohio, Attention—Frank C. Cech (1950 A.F.S. Apprentice Contest). Arrival deadline is April 1.

Contest standings of entrants in the five divisions will be announced soon after judging and results of the competition and pictures of the winners will be published in the May issue of AMERICAN FOUNDRYMAN. A discussion of the entries and illustrations will appear in "The Foundrymen's *Own* Magazine" in one of the summer issues.

The three winners in each of the five contest divisions will be notified immediately after judging. The American Foundrymen's Society will provide round trip rail and Pullman fare to each of the five first place winners to enable them to attend the A.F.S. Convention and Exhibit in Cleveland. There, during the Annual Business Meeting, Wednesday, May 10, each will receive $100 first prize money and a certificate of recognition from National President E. W. Horlebein.

Second and third place winners receive $50 and $25, respectively, and recognition certificates, generally at plant or chapter ceremonies.

Wood and metal patterns, and casting entries in steel, non ferrous, and gray iron—representing the five contest divisions—will be on display during the Convention in the Apprentice Contest exhibit.

Apprentice pattern makers entered in the A.F.S. Apprentice Contest stand with their entries at the February 10 meeting of the Southern California Chapter. Best three patterns will be sent to Cleveland prior to the Society's Foundry Congress and Exhibit for final judging in competition with entries representing the best from all parts of the United States and Canada.

METAL FOUNDING through the ages

Hugh O'Neill
Professor of Metallurgy
University College
Swansea, Wales

This article, excerpted from the 1949 Edward Williams Lecture, given before the 1949 Annual Conference of the Institute of British Foundrymen at Cheltenham, England, discusses the ancient history of cast metals. Information given herein on prehistoric casting of metals in the British Isles provides an interesting corollary to Bruce L. Simpson's* Development of the Metal Castings Industry. *The Institute of British Foundrymen's Williams Lecture, like the A.F.S. Charles Edgar Hoyt Annual Lecture, is given annually by an outstanding authority on some phase of the foundry industry.

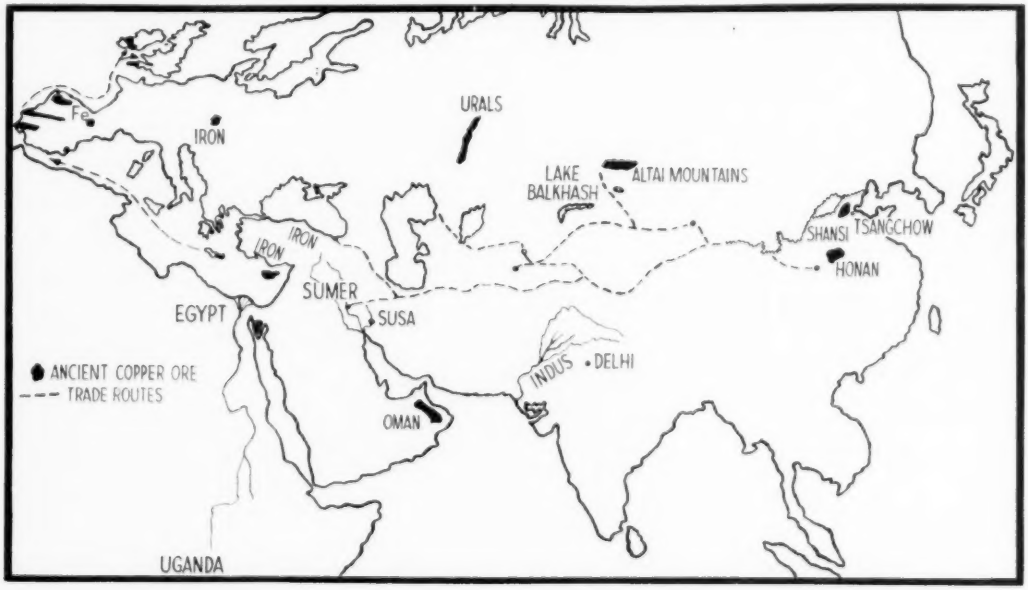
METALCRAFT becomes supremely worthwhile when its ends are consciously appreciated by those who practice it and especially when these are permeated by a sense of vocation. The great medieval metallurgist Biringuccio has expressed this outlook very well. He wrote as follows, "Concerning the Art of Casting," in the Preface to his Sixth Book: –

". . . In order to describe the whole art in every part, I say that the greatest labors of both mind and body are required for its operations in the beginning, middle and end. It is indeed true that these labors are endured with pleasure because they are associated with a certain expectation of novelty, produced by the greatness of art and awaited with desire, particularly since the artificer sees that it is an art pleasing and delightful even to ignorant men. As a result, as if ensnared, he is often unable to leave the place of work."

Here we catch the authentic thrill of the metallurgist engrossed in his craft and can appreciate the inseparable connection between art and the quality of human living.

Whereas to-day our industrial producers satisfy themselves, at most, with a functional aspect of art, the metal-smiths of old seem to have delighted in expressing themselves and pleasing their clients by ornamentation of the most utilitarian articles. Our

Fig. 1. Ancient copper deposits and trade routes



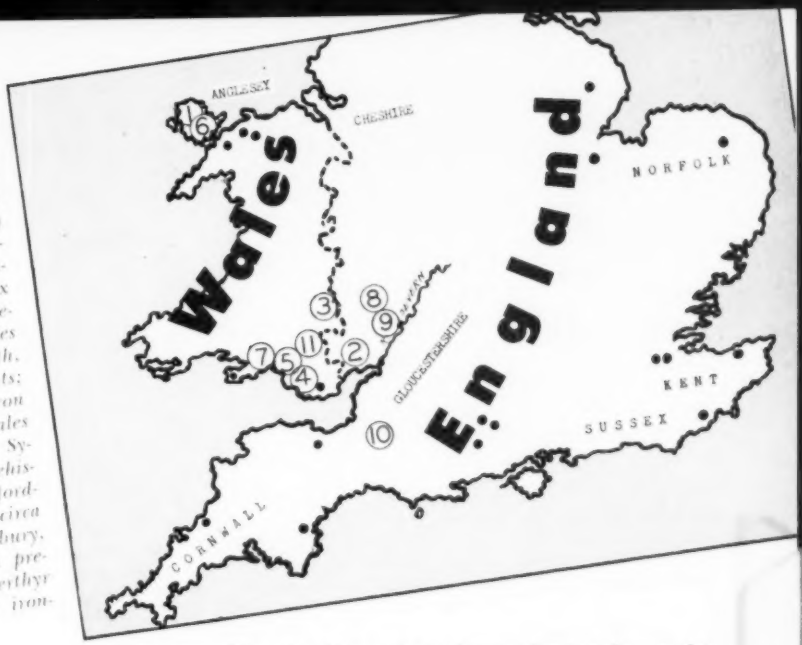


Fig. 2. Map showing prehistoric, pre-Roman, Roman and medieval foundry centers in southern England and Wales. Dots indicate where primitive molds have been discovered. Key to numbers: (1) Ty Mawr, Wales—prehistoric copper mines; (2) Guilsfield, Monmouthshire—early bronze lost-wax casting; (3) Llyn Fawr, Wales—prehistoric ironwork; (4) Coity, Wales—Bronze Age mounds; (5) Neath, Wales—Roman cast bronze weights; (6) Llyn Gerrig Bach, Wales—Iron Age implements (7) Swansea, Wales—prehistoric brasswork; (8) Symonds Yat, Herefordshire—prehistoric castings; (9) Birdlip, Herefordshire—early bronze mirror, circa A.D. 75 found; (10) Glastonbury, Somersetshire—crucibles from pre-Roman lake village; (11) Merthyr Tidfil, Wales, 16th century iron-founding center.

practice proceeds towards "push-button control" with little opportunity for human skill to flourish except in a few jobs such as the production of very special molds or blacksmith's work.

The Earliest Metallurgy

For a study of the past, a map centered on Persia enables us to appreciate the geographical relation between regions of prehistoric industry (Fig. 1). The ancient peoples in the lands north of the Persian Gulf were great metallurgists, and axeheads and mirrors in cast copper were used in Susa before the Flood. After that event all the technical processes of gold and copper smithing had reached maturity by circa 3500 B.C., the smelting of copper ore from Oman and the making of bronze castings having been mastered.

A striking example of Sumerian wrought metalwork is the large golden helmet of Mes-Jalam-Dug dating from before 3000 B.C.[3] Simultaneously, bronze castings were being made in the Nile Valley and probably along the Indus in India. Opinions differ as to whether any one of these localities was the original cradle of metallurgy, and there is a modern theory that tool-making men first arose in Uganda, but all of them preceded Europe in metallurgical development.

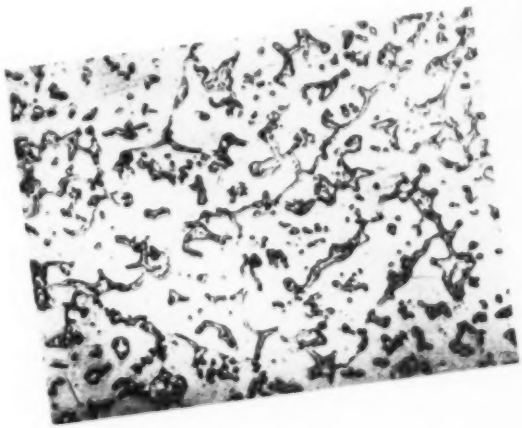
Copper was being mined in Cyprus by 3000 B.C. and metal work at Knossos in Crete reached a high standard about this time, from whence it spread to Greece and Central Europe. Frescoes at Pompeii show metalsmiths of Roman times busy at their tasks.

Meanwhile, from about 2200 B.C. the casting of copper alloys was proceeding in China, and remarkable bronze bells and wine vessels of the Chou period (1100-250 B.C.) may be seen in the Victoria and Albert Museum. The Chinese bronzes are distinct from those of Sumer in containing notable quantities of lead, but the exact source of their copper is not certain. There is evidence of a trade route between Greece, the Black Sea and the Lake Balkhash region from the 6th century B.C. (see Fig. 1). In the Seventh Century A.D. the Chinese excelled[4] in the casting of mirrors of speculum metal and at this time they had a silk traffic with Rome.

Gowland[5] was satisfied that the first bronzes were obtained by the smelting of copper ores containing tin-stone and such ores are found together in the Caucasus, Bohemia, Spain and Cornwall. There seems to be no trace of metallic tin in the very early founders' hoards in the West, and it was not employed for making alloys until the Iron Age. A practically uniform tin content of 10 to 12 per cent in the early Sumerian bronzes possible indicates a good control of operations.

Archaeologists are satisfied that prehistoric metal prospectors from Spain and Western France first settled

Fig. 3. Microstructure (X50) of prehistoric copper alloy. From casting found near Glamorgan, Wales.



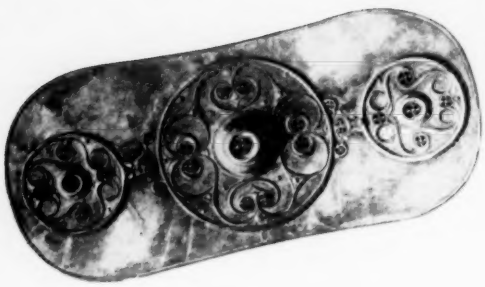


Fig. 4. British bronze shield cast around the time of Christ, found in the Thames River valley, England.

in Ireland and Cornwall, with the result that our Early Bronze Age culture came, not in the main from the South and East, but from the West. There is no reliable evidence that copper or gold was mined in Britain until Roman times,[6] though Davies[7] suggests that the Alderley Edge copper mine in Cheshire is partly prehistoric and copper may similarly have been mined and smelted at Ty Mawr, Holyhead.[9] (Fig. 2.) On the other hand, the gold-bearing gravels of Wicklow, and the copper ores of Cork and Kerry were exploited from about 2300 B.C., and Ireland was "the unchallenged work-shop of the Western world" up to about 1500 B.C. She presumably imported tin from Cornwall (though Davies mentions tin in Wicklow), and bronze was traded into Britain via South Wales and the Severn Valley in considerable quantities.

There was also an early traffic to Anglesey and North Wales, which proceeded south via the upper reaches of the Severn. These routes are indicated in Fig. 2. At a later date, bronzesmiths from the Continent came into the South and East and combined their own methods with the native work of Irish descent to give a British school of metallurgy.[8, 9]

The trade from Ireland had tapered off by 1500 B.C. and about 1000 B.C. there commenced a new phase with the intrusion from the West of merchant and itinerant unattached craftsmen bringing in an improved technique of bronze founding.

The first metallurgical industry in South Wales produced a special type of cast socketed-axe based on Western-French originals. Runners and wasters are included in "founders' hoards" of these axes, the defeat in one case, for instance, being due to the omission of the sand core.

The lower part of a sword scabbard in cast bronze found at Guilsfield, Monmouthshire, (Fig. 2), had been made by the cire perdue (lost-wax) process, now used for casting gas-turbine blades, and dates from 100-400 B.C. One of these units from western France set up in business in Glamorgan but it appears that his stock-in-trade was looted by Black Mountain natives, who dropped their metal booty in Llyn Fawr (Fig. 2) near the Brecon borders where it was recovered not long ago.

The fuel for these melting operations was undoubtedly charcoal, but it is interesting to note that excavation of two Bronze Age Mounds (circa 1400 B.C.) at Coity near Bridgend (Fig. 2) revealed the use of transported mineral coal as a fuel for the cremations which had taken place.[10] The Romans smelted lead with coal in Flintshire, and the early use of coal in China will be referred to later on.

TABLE I.—ANALYSIS OF ANCIENT COPPER ALLOYS.

	Fragment from Merthyr Mawr, Glam., 350 B.C.	Egyptian Axehead, 1800 B.C. *	Bronze Age copper from Ireland (ref. 5)	Horse† harness, Susa (Persian Gulf), 2750 B.C.	Flat axe from Ireland (ref. 5).
Copper	91.2	96.9	96.99	98.5	86.2
Tin	tr.	0.2	0.08	tr.	12.5
Antimony	tr.	—	nil	—	0.26
Iron	1.2	0.7	0.30	1.34	0.19
Arsenic	tr.	1.5	2.17	tr.	0.68
Nickel	0.3	small	trace	0.12	nil
Lead	2.3	—	0.06	—	tr.
Zinc	3.6	tr.	—	—	—
Hardness.	(Vickers)	(Brinnell)			
Annealed	—	57			
As received	62	—			
On flat	—	90			
Cold worked (At the edge)	114	112			
Microstructure	Cored. One twin noticed	Cored. Twinned and slightly cold worked			

* H. C. H. Carpenter, *Nature*, April 18, 1931.
† R. de Mecquenem, *Metaux et Civilisations*, 1946, 1, 77.

The Early Iron Age in Britain

In England the Iron Age may be considered to have begun around 500 B.C. but the metal was not cast until much later. The iron was reduced without actual melting and was hammered into shape—even to make a type of money known as currency bars, examples of which are preserved in the Cheltenham Museum.

Currency bars of about 309 grams conform with Roman cast bronze weights from Neath (Fig. 2) and Charterhouse (Mendips). Iron Age finds have been made at Llyn Cerrig Bach (Fig. 2) in Anglesey and at Merthyr Mawr Warren[11] not far from the great new works of the Steel Company of Wales. Excavation of the sand dunes near the sea at this latter site has revealed fragments of soft globular crucibles and two simple hearths where "bronze" and iron were worked.

Some fragments of the copper alloy given to the lecturer by Mr. Wyndham Wilkin and believed to date from circa 350 B.C., had the cored microstructure shown in Fig. 3. Dr. N. P. Allen of Britain's National Physical Laboratory kindly arranged for micro-chemical analysis of filings taken from one of the fragments and the results obtained are given in Table I. The metal is brass since it contains no tin, and the product of these early metallurgists of the Swansea district (Fig. 2) can be compared with that from more ancient sources reported in the same table. The importance of the minor constituents as geographical tracer elements will be appreciated. There is a medieval reference to lead ore in this district and perhaps the veins contained some zinc. Otherwise calamine may have been imported from Somersetshire or Gloucestershire, or the metal may have been from a remelted casting.

On both sides of the lower Severn River there are the sites of many metallurgical finds. Symonds Yat, Herefordshire, (Fig. 2) and the Malvern Hills have yielded various specimens, and Bredon Hill Fort (circa

100 B.C.) has provided some interesting cast fittings for horse harness. From Birdlip, on the Cotswold Edge above Gloucester, (Fig. 2) a fine bronze mirror (A.D. 75) has been recovered and metallurgy was practised in the pre-Roman lake village at Glastonbury (Fig. 2), using triangular thin fireclay crucibles.

Going further afield, one of the finest specimens of British cast bronze, circa 20 B.C., is the shield from the Thames at Battersea which is ornamented with red-enamelled studs (Fig. 4). At the beginning of the Christian era there appears to have been a reverse trading of metal from the Severn region to Anglesey, as most of the Llyn Cerrig finds seem to have originated in the South West.[14] From about this time the Forest of Dean commenced to be the early Black Country of Britain.

Prehistoric Molds in the British Isles

The discovery of a Bronze-Age tool or weapon at a given place is not evidence that founding was carried out at the same spot. The recovery of a mold, however, does suggest that a foundryman has been at work, and in Fig 2 the lecturer has marked various places where prehistoric molds have been reported.[6, 12, 13] The finds are very widely distributed and support the general idea that the smiths travelled round from place to place like itinerant tinkers, carrying stocks of hot-fractured cakes of bronze to make and repair various articles for the chieftains. The following materials have been used for prehistoric molds:

Wood. Molds of wood for casting tin coins have been found in the Kent district and are believed to belong to the beginning of the Christian era.

Stone. In the United Kingdom all open molds (see Fig. 5) were of stone, generally micaceous sand-stone, schists or mica slate. It has been suggested on technical grounds that these stones were actually used for making a wax pattern to be employed later with clay molds.[15] In the Danish Art Exhibition held in London in 1948, a sandstone mold (800-400 B.C.) was shown, together with one of the same period composed of imported steatite. Incidentally, medieval cast badges of white metal in the British Museum were made in molds carved out of shale.

Fig. 5. Molds of micaceous sand stone, schists or mica slate were used to cast Bronze Age flat axes.

Burnt Clay. Two-part, as distinct from open, molds were generally made in clay which was subsequently fired to a brick-like consistency and heated to dull redness before casting swords and daggers. Registering of top and bottom was ensured by projections in the cope and indentations in the drag. Examination of the surface of a sword has shown that a wooden pattern of ash had been used. Fig. 6 illustrates half of a mold using a core (A), locating core pin (B) and bronze chaplets (C) for making a bronze spear.[5] The foundry work evidently reached a high degree of proficiency, for, apart from the point and edges, the walls of some of these hollow spears were only 1 mm thick.

Bronze. Permanent molds in bronze for palstaves are known, one having been recovered at Hotham Carr, Yorks.

Cast Iron. The British Museum catalogue of Chinese coins refers to cast-iron molds having been used for coins dated 7-22 A.D.

The Casting of Coins

Coinage was one of the most momentous of inventions. Metallurgists are not indifferent to these articles and it was rather pathetic to read that the Snettisham hoard unearthed in Norfolk during December, 1948, contained 77 coins, which probably represented the savings of an Iron Age metalsmith.

About 100 B.C. Belgic invaders coming into Kent brought from their Mediterranean civilization a coinage based on a Greek model. The Snettisham specimens of tin were probably made in Britain during 85-75 B.C., and were cast in groups, with connecting runners, in wooden molds. Each coin was afterwards separated by a chisel so that ends of the runners remain attached in many cases. Curiously enough, such tin coins are seldom found in or near Cornwall.

The people of the Cotswolds and the lower Severn began issuing money bearing the names of king about the beginning of the Christian era, and some cast British coins found at Hengistbury Head were made during the Roman occupation. Cast-iron coins appear to have been made in terra-cotta molds in China about 25 A.D.

An account appeared in 1945 of a chance discovery in India by which the method of molding bronze coins near Delhi about 100 B.C. has been determined.[16] Discs of clay with eight cavities connected by runner to a central downgate were built up into cylindrical molds as shown in Fig. 7. This mold was heated to 600 to 650 C and casting took place down the central pouring basin. Minting has largely developed by the stamping of wrought metal, and in later times the coin founder has mainly been involved in operations which would not gain official approval.

Statues and Bells

Straight brass is referred to in the first century A.D., though some cast ornaments of copper-zinc alloy (23 per cent zinc) belong to 1,000 B.C. and others found in the island of Rhodes must have been made prior to 600 B.C. Roman brasses at the beginning of the Christian era contained, for example, 9 per cent zinc and 3 per cent tin, and were produced by introducing cala-

mine ore with charcoal and copper into a crucible. Early brazing was not carried out with brass, but various copper solders were used in ancient times and lead alloys were used for jointing purposes.

Casting tin alloys were developed during the Middle Ages, and the ordinances of the Guild of Pewterers of London (1348) prescribed an alloy containing about 26 per cent copper. "Slush casting" methods, by pouring low-melting-point alloys into a split mold and almost immediately inverting it to drain out the still liquid center were known to the ancient Egyptians. They are still employed for Britannia metal, lead-antimony and aluminum-zinc alloys. The Company of Founders obtained its ordinances in 1365 and its work was allied to that of the Pewterers.

Tombs Examples Of Foundry Art

During the 13th and 14th centuries the best foundry work is evident in the beautiful memorial effigies on the royal tombs in Westminster Abbey. Cast brass pots and bronze bells are known from the 11th century, and Gloucestershire was a famous county for making bells from 1270 onwards. Details are plentiful regarding this medieval industry but it is not so well known that about 100 years ago, Meyer of Bochum and Vickers of Sheffield made bells of crucible cast steel—some molds requiring the contents of 500 pots to complete the casting. Mention of bells may conclude with "Ivan the Great" of the Kremlin, made in 1738 and weighing 200 tons.

Bell founding lent itself to mortar and gun casting, and cannon and bombards of copper, brass and bronze were produced during the 14th century. Biringuccio[1] gives precise details for molding and finishing these muzzle-loaders. The melting furnaces increased in height and efficiency until the fusion even of ferrous alloys became in Europe a regular (as distinct from an occasional) operation.

Cast Iron and Steel

Nationalization of an industry making iron is not new. It happened in China during 115 B.C., where the manufacture of iron castings had taken place since 206 B.C.[17] Mineral coal seems to have been used for the purpose in Shansi province in ancient times and Read at one time suggested that it may have introduced phosphorus which lowered the melting point and facilitated founding. Cast-iron swords of 200 A.D. are known, and the great lion of Tsangchow—20 ft. high and 18 ft long—had been cast before 1000 A.D. (see Table II, col 2).

Cast iron was known in Greece about the 6th century B.C. for Pausanias writes of "Theodorus the Samian who invented how to pour iron and fabricate statues from it." Read has also deduced that a tall furnace illustrated on a Greek vase would almost certainly have been capable of melting iron. These references show that ironfounding was not an invention of the Middle Ages as is frequently stated.

In Wales the Laws of Hywel Dda (circa 925 A.D.) enumerated the necessities of the Royal Household and one translation mentions boiling pots of cast iron.[18] The original wording probably does not justify the use of the word "cast."

Medieval ironfounding seems to have been practised at Liege (circa 1350) and Thuringia in 1377. The production of iron cannon developed in France during the 15th century and the founders came to England in 1509[19] to establish the industry here, where the quality of their cannon was soon pre-eminent.[20]

The Weald of Sussex became the chief centre of the manufacture of ordnance but founding was also established at Merthyr (Fig. 2) in 1555 and guns were being cast at Pentyrch by 1596. Table II indicates that the chemical composition of cast irons has not changed greatly over many centuries.

TABLE II.—ANALYSES OF CAST IRONS.

	Ancient Chinese castings.*		Coal-brookdale Iron Bridge, 1779.†	B.C.I.R.A. nodular iron, 1948.‡
	502 A.D.	953 A.D.		
Total carbon	3.35	3.96	3.63	3.49
Comb. carbon	1.05	3.35	—	—
Silicon	2.42	0.09	1.10	2.89
Manganese	0.13	—	1.09	0.88
Sulphur	0.067	0.022	0.066	0.008
Phosphorus	0.21	0.23	0.52	0.055
Cerium	—	—	—	0.058

* M. Pinel, T. Read and T. Wright, *A.I.M.M.E. Tech. Pub.* 882, *Metals Technology*, 1938, 5.

† Analysis kindly supplied by Mr. R. S. Darby, of Messrs. Darby & Co., the original contractors.

‡ H. Morrogh and J. Grant, *Proc. I.B.F.*, 1947-48, XLI.

It is not easy to state when steel was first fused and poured. Robert Hooke entered in his diary for November 12, 1675, that he had heard about the finest steel being made by melting cemented bar and casting it into ingots for forging. Huntsman perfected a crucible in 1740 which enabled liquid steel to be poured into molds, and Krupp used his process to make large guns. J. O. Arnold showed "the magical effect of aluminum" in controlling the dissolved gases in the metal, and the same element has enabled steel castings to be produced which have mechanical properties almost equal to those of forgings.[21] As regards size, a large steel anvil weighing 1,000 tons has been cast at Terni in Italy and the "block-buster" bombs of the recent war represent an important stage in the art.

Modern Trends

During the present century, physical metallurgists have been studying the effect of gases and inoculants on the behavior of freezing metals and alloys with valuable practical results. The application of scientific methods to foundrywork is let to the production of cast irons with "nodular" or "spheroidal" graphite and of aluminum alloys with "modified" microstructures. Development of melting units such as the balanced blast cupola of the British Cast Iron Research Association and rotary furnaces may be noted.

The use of oil or powdered coal facilitates the control of melting operations, and the study of sands and bonding materials has greatly improved the properties of molds. The surface quality of the castings also depends upon the structure of the sands and may be investigated by scientific methods.[22] It is in the direction of molding machines and casting machines that much progress has been made. Laing in 1843 took

out a patent for continuously casting soft metal tubing, and Bessemer in 1858 tried to treat metal like glass and pour it on to moving rolls for making strip and plate. In 1865 he succeeded in casting continuously a length of soft iron strip, but it is with aluminum and its alloys that most success has been obtained.

The Junghans method of tranquil running produces cast slab of fine crystal size, and Duralumin ingots with an outer surface of pure aluminum ("Alclad") may be made by these processes. The Williams apparatus, with water-cooled molds, is being perfected in U.S.A. for the continuous casting of steel slabs, and by this means the yield of metal of good macrostructure will be high. For molten alloys having tenacious surface-oxide-films liable to become entangled in the castings with deleterious results, transfer of metal from crucible to mold may be performed under the film by means of the Durville process.

The die casting of printers' type was introduced by Bruce in 1838 and the linotype machines in newspaper offices undertake a large weight of casting every day. Lead-, tin- and zinc-base alloys are the easiest to operate, but the die casting of semi-molten brass and bronze at pressures up to 10,000 psi is now common-place.

Iron castings can be produced by the Wetherill vacuum process from temperatures of 1,400 C with finished dimensions to ± 0.005 in. so that tumbling is eliminated and machining is generally unnecessary.

Centrifugal casting for iron pipes was introduced in 1911 and for bronze gear blanks (to give a fine macrostructure) by 1930. About 1920, Watertown Arsenal, U.S.A., produced steel cannon by casting in a horizontal metal mold rotating at high speed. When the lecturer saw the process in 1931, a high-frequency steel melting furnace was picked up bodily by a crane and poured steadily into one end of an apparatus looking and sounding like a turbo-generator. Eventually a hollow cast gun-barrel was ejected from the other end. Centrifugal methods are now in use in this country for metalling bearing liners and for producing complicated steel structural components.

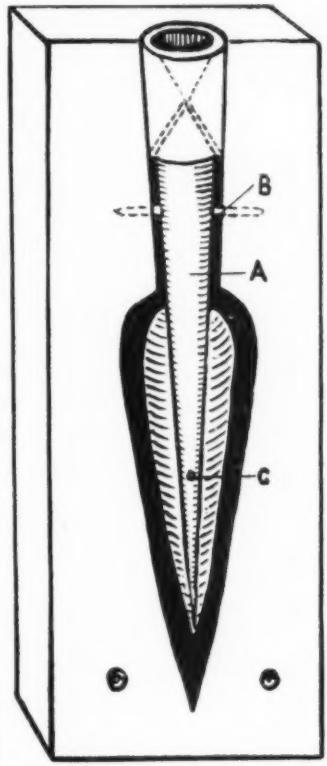


Fig. 6. Half mold for early hollow bronze spearhead showing (A) core, (B) locating pin for core, and (C) bronze chaplets. These two-part molds were generally made in clay which was fired to brick-like consistency and heated to dull redness before casting. Apart from point and edges, walls of some of these hollow bronze spears were only 1mm thick.

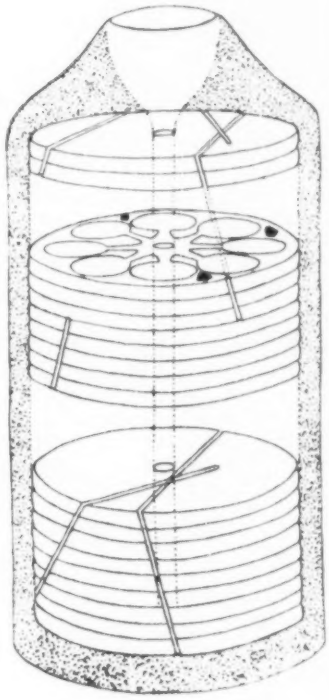


Fig. 7. Method of molding bronze coins in India about 100 B.C. used discs of clay with eight cavities connected by runner to downgate and built up into cylindrical molds. Mold was heated to 600-650 C before casting.

Looking ahead from these various processes which improve conditions for the foundrymen and give products of better quality, the thought arises whether economies may yet be made by the greater use of direct casting from highly controlled smelting furnaces into continuous casting machines. In 1921, at Pont-a-Mousson, large iron pipes were being poured direct from the blast furnace with no evident difficulties, and this same principle may possibly be exploited in other directions. For light, hollow castings perhaps we shall smelt and volatilise metals with low boiling-points and carefully condense them in their permanent molds. It may not be ridiculous to sublime first an outer layer

having special properties and then turn the gas supply over to a base metal backing. It would be unwise to speculate any further, for these historical cavalcades could prompt the imagination to a point where one might exclaim in Heyward's words: "But oh! I talk of things impossible and cast beyond the moon."

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MOUNT METAL SPECIMENS AT ROOM TEMPERATURE

A SIMPLE, INEXPENSIVE METHOD for mounting metallurgical specimens at temperatures only slightly above room temperature and without the external application of heat has been developed by Denton L. Smith of the National Bureau of Standards (Technical Report 1407). The technique employs a denture material of modified acrylic resin as the mounting. This material consists of a polymer and monomer which, when mixed in the proper proportions, will polymerize or set under pressure at room temperature. As the amount of heat generated by the polymerization reaction can be controlled by varying the amount of resin present, the new procedure makes it possible to mount a wide variety of specimens for polishing and microscopic examination without disturbing the crystal structure.

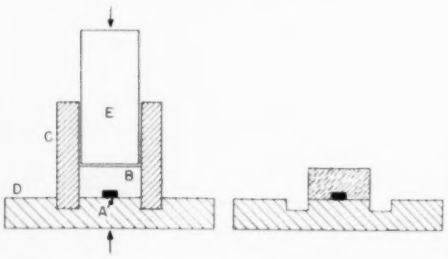

Diagram illustrating a method for mounting metallurgical specimens at room temperature without external application of heat. Left—metallic specimen (A) is placed in a quantity of semi-solid unpolymerized denture resin (B) within a mold consisting of a hollow cylinder (C), an anvil (D), and a piston (E). Pressure between the anvil and piston causes the resin to polymerize into a solid block (right) containing the specimen.

In studying the properties of metals, it is often necessary to embed a small metallic specimen within a larger piece of material in order that it may be conveniently held for polishing and microscopic observation. Several methods are now in use for mounting in bakelike, lucite, or solids formed by the setting of resinous powders. However, in all these procedures the specimen is heated to a high temperature under pressure, which often causes recrystallization and change in the structure of the metal. Moreover, rather expensive equipment is usually required. The method developed at the Bureau may be carried out in 15 to 30 min, depending on the temperature of the room, without the use of special equipment other than an inexpensive mold and a clamp or vise.

The mold used at the Bureau is of brass and consists of a hollow cylinder which fits into a depression in an anvil and contains a movable piston. The cylinder is about 1.25 in. in diameter with 0.25-in. wall thickness. A quantity of the unpolymerized resin containing the specimen to be mounted is placed in the cylinder, and pressure is applied between anvil and piston during polymerization by means of a bench press or vise operating in a vertical direction. A thermocouple entering the resin through the cylinder walls permits observation of the temperature rise during the reaction.

As it solidifies the unpolymerized resin will bond to a piece of the solid resin placed in intimate contact with it in the mold. It is thus possible to give additional bulk to the mounting without polymerizing enough resin at one time to cause an excessive temperature rise. The specimen to be mounted is placed in a small quantity of unpolymerized resin beneath a previously cured blank in the mold. The mold is then closed and pressure is applied. When the reaction is complete, the blank and the resin containing the embedded specimen are tightly joined.

Wisconsin

REGIONAL FOUNDRY CONFERENCE

ATTENDANTS at the 13th Annual Regional Foundry Conference of the Wisconsin Chapter and the University of Wisconsin, held February 9 and 10 at the Hotel Schroeder, Milwaukee, found a wide variety of foundry information in the 24 technical sessions scheduled.

The conference was opened by Chapter President R. C. Woodward, Bucyrus-Erie Co., who commented on the excellent relations existing between the Wisconsin chapter and the University of Wisconsin, and introduced Dean M. O. Withey, college of engineering. The dean discussed registration of engineers.

National President E. W. Horlebein—introduced by Prof. G. J. Barker of Wisconsin, along with Prof. E. R. Shorey an associate chairman of the conference—spoke on *"Your A.F.S."* and pointed out that the Society's broad activities cover all job classifications and all phases of foundry operation and castings use. He paid tribute to the Wisconsin Chapter and its officers for continuing to provide opportunities to learn through its annual regional conference.

Walter W. Edens, Badger Brass & Aluminum Foundry Co., chairman of the conference and vice-president of the Wisconsin Chapter, presided at the first day's noon luncheon. The speaker, Kenneth Haagensen, Allis-Chalmers Mfg. Co., said everybody has to sell somebody something to be a success in his talk *"What Kind of a Salesman Are You?"*

Following luncheon the first of four rounds of sectional meetings provided: Lester B. Knight, Lester B. Knight & Associates, Chicago, speaking on *"Routing of Castings Through the Cleaning Room;"* National Director N. J. Dunbeck, Eastern Clay Products, Inc., Jackson, Ohio, on *"Slight Variables Affect Sand Properties;"* E. Braun and S. D. Martin, Central Foundry Div., General Motors Corp., Danville, Ill., on *"Progress Through Motion Study and Better Methods;"* Hiram Brown, Solar Aircraft Co., Des Moines, Iowa, on *"Precision Light Metal Castings;"* D. I. Dobson, General Malleable Corp., Waukesha, Wis., on *"Gating of Gray Iron Castings;"* and E. D. Coleman, Coleman Instrument Co., whose subject was *"Spectrophotometry."*

R. C. Woodward, Bucyrus-Erie Co. (starting left), Wisconsin Chapter president, National President E. W. Horlebein, and National Vice-President Walton L. Woody, pose for Chapter and Conference Photographer W. T. Napp, Badger Firebrick & Supply Co.

Walter W. Edens, Badger Brass & Aluminum Fdry. Co. (right), gets advance information on luncheon talk from Kenneth Haagensen, Allis-Chalmers Mfg. Co.

At the steel session, Mr. Knight said extra cleaning room work could be eliminated by careful planning of patterns, gating and risering, and pouring. He recommended putting all cleaning room work on an incentive basis. Presiding were O. H. Kraft, Bucyrus-Erie Co., and Walter Punkow, Wehr Steel Co.

Mr. Dunbeck told his listeners in the gray iron session that foundry scrap could be reduced if foundrymen expended as much effort applying what is known as is spent gathering new information. Co-chairmen of the session were George P. Antonic, Walter Gerlinger, Inc., and Leslie Woehlke, Grede Foundries.

Show Film On Foundry Techniques

The popular demonstration and film comparing efficient and inefficient foundry techniques was presented by Mr. Martin and Mr. Braun at the malleable session. Actual examples from General Motors foundries showed how better methods enable men to accomplish more with less effort. Co-chairmen were H. C. Stone, Belle City Malleable Iron Co., Racine, Wis., and Martin A. Harder, Lakeside Malleable Castings Co., Milwaukee.

Mr. Brown described five different casting processes for aluminum alloys in presenting a comprehensive

How the early Wisconsin Regional Conference crowd looked from back of the registration table. At right

luncheon speaker E. A. McFaul, Chicago, warms up to his subject, "So You Think You Are Slipping."

paper, which will appear in AMERICAN FOUNDRYMAN.

Presiding at Mr. Brown's session were A. R. Tooman, Racine Aluminum & Brass Foundry, Racine, Wis., and Kenneth L. Jacobs, Standard Brass Works.

Current good shop practice in gating of gray iron castings was outlined by Mr. Dobson. Harry Arneson, Spring City Pattern Works, Waukesha, Wis., and M. C. Frankard, Delta Mfg. Co. were co-chairmen.

At the first technical session, Mr. Coleman explained the principles of spectrophotometry. H. F. Haase, Marquette University, and Walter Johnson, Crucible Steel Casting Co., presided.

Second steel session featured Charles Locke, Armour Research Foundation, Chicago, in a discussion of "*Mold Cavity Gas Formation as Related to Steel Castings*," reported some of the work going on at the Foundation and drew on his experience as a steel foundryman to make practical applications of the information being developed. E. G. Tetzlaff, Pelton Steel Castings Co., was chairman; G. V. Jedinak, Sivyer Steel Casting Co., was co-chairman.

Tells New Foundry Developments

H. H. Harris outlined his recent work in developing radically different casting methods and foundry techniques in his talk "*New Evaluation of Casting Processes by Navy Research*." His gray iron listeners heard him describe a centripetal casting process, a "comparascope" for evaluating mold and castings surfaces, a pyrometer for continuous recording of ladle temperatures, and grain size control.

Presiding at the session were A. R. Janes, Jr., Standard Foundry Co., and L. B. Koenig, J. I. Case Co., both of Racine, Wis. Some of the developments disclosed by Mr. Harris will appear in the Modern Foundry Methods section of AMERICAN FOUNDRYMAN.

A plea for more attention to fundamental principles of making molds was voiced by W.W. Eichenberger, Milwaukee Foundry Equipment Div., Spo, Inc., in speaking on "*Getting the Most Out of Your Molding Machines*" at the second malleable session. Co-chairmen were R. N. Schaper, Wisconsin Appleton Co., and J. G. Kropka, Chain Belt Co.

Stating that the more people who know how to make permanent mold castings the more business there will be for all, John T. Watry, Aluminum Casting & Engineering Co., answered his own call for greater dissemination of information by describing permanent mold design and production in detail. He cited the A.F.S. research film, "*Fluid Flow in Transparent Molds*," in explaining the importance of avoiding turbulence in gating systems. J. D. Clafley, General Malleable Corp., Waukesha, Wis., and L. J. Andres, Lawran Foundry Co., presided.

Zirconium Sands Uses

Pattern makers attending the late afternoon pattern session heard Nels Olson, Kindt-Collins Co., discuss pattern supplies, and witnessed the movie "*Green Harvest*" presented by George D. Mill, Weyerhaeuser Lumber Co., Milwaukee. William Kollmorgen, Kollmorgen Pattern Works, and Harry Arneson, were co-chairmen.

High fusion point, chilling action, resistance to metal wetting, greater strength of cores, and low friability were given as advantages of zirconium sands by John R. Lewis, Titanium Alloy Div., National Lead Co., at the late Thursday technical meeting. Presiding were Bradley H. Booth, Carpenter Brothers, Inc., and A. J. Popovich, Chicago Hardware Co., North Chicago, Ill.

Chapter President R. C. Woodward presided at the conference banquet, Thursday evening. Banquet speaker Oscar Rennebohm, governor of Wisconsin, explained the similarities between political administration and business adminstration.

Second day of the conference started with talks on heading and gating, cupola operation, mechanization, bronze casting problems, pressure cast patterns and core boxes, and metallurgical uses of gases.

Fred B. Riggan and Harold Schulte explained Key Co. (East St. Louis, Ill.) heading and gating practice at a steel session. Chairman was Anthony Herrmann, Belle City Malleable Iron Co., Racine, Wis., with Eugene Schneider, Grede Foundries, Inc., as co-chairman.

Correct use of cupola raw materials was described by B. P. Mulcahy, Fuel Research Laboratory, Inc., Indianapolis, Ind., at a heavily attended meeting. Har-

old Sohner, International Harvester Co., and F. W. Busche, General Foundries Co., presided.

P. C. Debruyne, Moline Malleable Iron Co., St. Charles, Ill., stressed the usefulness of mechanical aids to foundry production and said that a major difficulty is securing personnel adapted to new methods and machines. Co-chairmen at the session were N. Amrhein, Federal Malleable Co., and J. B. Gutenkunst, Milwaukee Malleable & Gray Iron Works.

Producing Electrical Fittings

In a discussion stimulating presentation of bronze casting problems, R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Barber, N. J., covered manufacture of high-conductivity copper castings, high leaded bronze, nickel silver, and yellow brass castings. C. Kotowicz, Ampco Metal, Inc., and D. S. Bosma, Bucyrus-Erie Co., were chairman and co-chairman.

Brass is the best metal for master patterns to be used repeatedly in plaster molding, said J. Mathias, Accurate Match Plate Co., Chicago, at a pattern session. Second and third best are white metal and aluminum alloys, he said, and went on to explain production of pressure cast match plates. Presiding were M. C. Frankard, Delta Mfg. Co., and A. M. Fischer, Charles Jurack Co.

At the morning technical session, L. H. DeWald, assisted by W. T. Hart, also of National Cylinder Gas Co., Chicago, outlined metallurgical uses of gases. R. J. Cox, Ampco Metal, Inc., and Norman Koch, Grede Foundries, Inc., presided.

George E. Tisdale, Zenith Foundry Co., was chairman of the luncheon meeting with E. A. McFaul, Midwest Institute, Chicago, speaking on *"So You Think You Are Slipping."*

A topic receiving more and more attention from foundrymen—*"Product Development"*—was the subject of W. J. Phillips, Steel Founders' Society, Cleveland, in the final round of group meetings. Charles Fuerst, Falk Corp., and Harold Ziebell, Crucible Steel Castings Co., were co-chairmen.

Francis G. Tatnall, Baldwin Locomotive Works, described use of brittle lacquer and the SR-4 strain gage for the analysis of casting stresses at the final gray iron session. Leslie Woehlke, Grede Foundries, Inc., was chairman; co-chairman was A. R. Janes, Jr.

At the last malleable session, L. R. Friedman, National Malleable & Steel Castings Co., Cicero, Ill., said that melting practice and not annealing practice does most to determine final characteristics of the metal in speaking on *"Simple Metallurgy of Malleable Iron."* Session co-chairmen were J. L. McIlhone, International Harvester Co., Waukesha, Wis., and Stephen Pohl, Federal Malleable Co.

Members of the non-ferrous "Information Forum" panel who answered a variety of questions from the audience were: Eugene W. Smith, Western Materials Co., Chicago; John Budnik, Wisconsin Aluminum Foundry; Walter W. Edens; Tom Kramer, W. F. Jobbins, Inc.; and M. E. Nevins, Wisconsin Centrifugal Foundry, Inc., who was moderator. Chairman and co-chairman, respectively, were Carl Van Buren, Allis-Chalmers Mfg. Co., and J. L. Kammermeyer, Federated Metals Div., American Smelting & Refining Co.

Discuss Pattern Division Program

L. F. Tucker, City Pattern & Foundry Co., South Bend, Ind., chairman of the A.F.S. Pattern Division, discussed division activities at the final pattern session. Co-chairmen were A. F. Pfeiffer, Allis-Chalmers Mfg. Co., and A. M. Fischer, Charles Jurack Co.

E. C. Hoenicke, Eaton Mfg. Co., Vassar, Mich., spoke on permanent molds and his company's machine for producing them at the wind up technical session. H. W. Gorman, Allis-Chalmers Mfg. Co., and R. W. McIntosh, Belle City Malleable Iron Co., presided at this concluding technical session of the conference.

Superior Foundry, Inc., Is Host To British Gray Iron Founders

These members of a 15-man British gray iron foundry productivity team, in this country under the auspices of the Economic Cooperation Administration to study U. S. gray iron foundry production techniques, were recently guests of Superior Foundry, Inc., Cleveland, for a day-long plant visitation and luncheon. Walter L. Seelbach, president and general manager of the company, and A.F.S. National Vice-Presidential nominee (seventh from left), presided at the luncheon. The British team spent a week in Cleveland and visited other U. S. gray iron foundry centers.

SUMMER FOUNDRY WORI

An Investment In

Wyllys G. Stanton
Associate Professor
Department of Industrial Engineering
Ohio State University
Columbus, Ohio

WELL DEMONSTRATED by many companies over a period of years is the value of hiring engineering college students for summer work in the foundry—a practice that has proved advantageous to both the foundries and the engineering students.

Advantages to the foundry are both direct and indirect. First, engineering students are good workers who learn new jobs so quickly they overcome objections that they are available for a short period only.

Another direct advantage is that students who work in foundries during the summer preceding their graduation are thinking about permanent employment.

Potential Permanent Employees

The manager who hires a student summer worker has an opportunity to study him and decide whether he wants him as a permanent employee. Likewise, the student has a chance to acquaint himself with the plant and its personnel and to picture himself as a permanent employee of the organization, not as a temporary worker. A substantial number of graduates now hold good foundry jobs as a result of this method.

Another and more immediate benefit to the company is the use of students to fill gaps left in organizations by vacation schedules.

Often the foundry manager is too busy with daily operating problems to study latest operating techniques. Such a man can benefit greatly by employing as his staff assistant a young engineer who has been schooled in modern foundry methods. The idea behind this practice is to form a team composed of older men who have long-time practical experience and younger men who have new theories and ideas. Although many of the student's ideas may be impractical, if he presents one good idea during an entire summer his wages are recovered many times over by an improvement that goes on even after the young man returns to school.

Use Students To Investigate Ideas

Another way of looking at this possibility is that many busy operating managers have good ideas they would like to investigate but lack the necessary time. In such a situation the young engineer can be given definite assignments to work out and report on to his superior.

Among the indirect advantages of employing engineering students as summer workers is that this practice contributes to the improvement of foundry education. Colleges are supported for the most part by taxes and it is up to industry to see that the money it pays in taxes for education is spent as productively as possible. If industry does not support the efforts of colleges to balance class work with coordinated practical experience, industry is failing to get an adequate return on its investment.

Men with wide experience in the foundry industry say that its greatest weakness is the lack of young men being prepared to take over active control when today's supervisors reach retirement age.

Two factors make it unlikely that there will be sufficient men coming up through the ranks to fill gaps left by retirement in the near future. First, foundry technology is advancing so rapidly that the rule-of-thumb methods a man can learn by merely being in a foundry for many years are inadequate. The successful foundry manager today is the one who has learned new methods or who draws technical assistance from many sources.

Second, heavy school enrollments show that many young men who formerly went from high school directly into the foundry industry are now taking a detour by way of the college campus.

The concern of the foundry industry with this problem of replacement is shown by its sponsorship and support of the Foundry Educational Foundation, whose purpose is to encourage and assist the young

(Below) Making core for campus lamp post extension on on

FOR STUDENT ENGINEERS

YOUR Foundry's Future

engineer who is sufficiently interested in the industry to want to gain practical experience in dealing with its problems.

During a summer spent working with a master foundryman, the young engineer will learn that the foundry is essential to the continued progress of America, that there is a thrill in working with hot metal and seeing useful articles produced by a direct process, and that there are many advantages in working in the foundry industry.

Even those young engineers who—after working a summer in the foundry—find that they prefer other engineering fields, cannot avoid learning something of the essential value of castings in industry. The chances are that at a later date these same young engineers will be employed in an industry that is a castings customer and at some time will be called upon to specify either castings or fabricated parts for machinery. Knowing castings and their advantages, they are more likely to specify foundry products.

Discussion of the possibilities of an engineering student aiding management in a staff capacity, or making suggestions for improvements, should not lead to the belief that these young men expect to be placed in managerial positions. An actual account of experiences of Ohio State University students who worked in foundries during the summer of 1948 will illustrate what really happens.

of Ohio State's seven power jolt hand rockover machines.

Six foundries in Columbus and two in Dayton employed some 15 students under varying conditions. Some of the students had completed a number of courses in foundry and allied subjects while some of the younger students were just starting specialized foundry courses. Some of these foundries were fully staffed and engaged in familiar work, so that there was little opportunity for even an experienced outsider to suggest ideas that had not been fully considered by the staff. Other foundries had problems that welcomed fresh points of view for their solution.

Typical Case History Outlined

The following report of a student will show how a typical case worked out:

"I was employed by the _____ Foundry in April on a part-time basis as a sand tester. In June they offered me a full time job as a trainee.

"The first week I hauled facing sand in a wheelbarrow to the molders and riddled heap sand the first six hours of the shift. The last two hours I worked on the charging floor. The second week I worked on the cupola, assisting the cupola tender in patching burned-out sections of the cupola and preparing the cupola for the afternoon heat. During the heat our job was to tap and plug the cupola.

"The third week I worked in the core room where I made cores, finished cores, prepared core sand, and worked on the core oven. The fourth week I worked as a molder's helper on the molding floor. My fifth, sixth and seventh weeks were spent in the pattern shop. Here I helped repair patterns and, guided by the foreman, made several core boxes and patterns.

"During the eighth week I worked with the general foundry foreman and the ninth week I worked with the superintendent. With both these men it was my job to follow them throughout the plant and observe the various problems with which they had to cope.

"The last four weeks I spent in the office and worked with the production manager, office manager, and plant manager."

Foundrymen Prove Cooperative

Everyone was anxious to help this student who wished to supplement his "book learning" with practical foundry experience. This did not entail extra work for the plant's foundrymen—just a word of explanation now and then, a few minutes spent answering questions. The student's questions were not a matter of prying into business that was none of his concern, but were rather a matter of collecting information for the written report required of summer students by the University.

The student is interested legitimately in the com-

pany's history, markets, financial position, and working force. In this particular case, arrangements were made for the trainee to submit his report to company management for review before it was turned in to the professor in charge of the University's summer experience course.

The trainee was frank in praising those phases of foundry work which he thought were well handled and in criticizing those which he thought could be improved. Some of this criticism was founded on lack of understanding of the problems involved, but some of it was considered by management to be very valuable. Even if the criticism were wrong, it had the advantage of letting management see itself through the eyes of an employee. In this case, management was sufficiently impressed by the trainee's report to ask the young man to return after his employment had ended to sit in on a staff meeting in which the points he raised were discussed.

Students Are Willing Workers

Many plant managers are under the impression that a large proportion of college students are playboy sons of rich families. Nothing could be farther from the truth. Today's engineering student is a serious-minded young man who welcomes an opportunity to learn foundry work "from the bottom up." His daily contact with regular foundry employees will help him to learn their attitudes and reactions in a way that will serve him well when he progresses to the point where he holds a managerial position.

Recently a foundry option was added to the industrial engineering curriculum at Ohio State University. Within the framework of the industrial engineering department's curriculum, it is possible for a student to specialize in such fields as foundry, personnel administration, plant layout, safety engineering, etc. All industrial engineering students receive some training in each of these fields, but concentrate the elective portions of their studies in the field that appeals to them most.

Engineering Students In Demand

Success of Ohio State University's foundry option is typical of those schools having such a curriculum accredited by the Engineers' Council for Professional Development, although the first students to complete foundry option at Ohio State will not be graduated until this June. At the Ohio Regional Foundry Conference of the American Foundrymen's Society, held in Columbus last March, some students received as many as six or seven offers of employment from foundry managers in attendance.

In spite of the recency of establishment of foundry option at Ohio State, several industrial engineering graduates already hold important foundry supervisory positions. One student, who worked in a large foundry as understudy, found himself successor to the superintendent, who died leaving no one else qualified to succeed him. In this particular case, the young man had worked in the foundry while attending school and had gained experience in handling men while in the Army.

The industrial engineer is primarily an engineer, not simply a technician trained in some specalized phase of work. During the first two or three years of his college course he takes such basic engineering subjects as mathematics, physics, chemistry, English, engineering drawing, mechanics, and strength of materials. During his latter school years he takes courses

Ohio State University foundry students pouring a drill stand base mold from a two-man shank ladle.

Ohio State University foundry student filling hand shank ladle from spout of cupola.

Instructor (back to camera) helping student to pour mold with hand ladle. (Photographs are courtesy Wyllys G. Stanton, Jr.)

in accounting, plant layout, economics, psychology, charts and graphs, personnel administration, production control, business organization, and principles of management.

At Ohio State, the industrial engineer is also required to take four courses in shop: welding, forging and heat treating; foundry practice; and elementary and advanced machine shop. The purpose of these courses is not to turn out capable mechanics, but to insure that principles underlying the processes are thoroughly understood and to acquaint the student with the problems confronting men who work at those trades. It has been observed that students with one or two summers of foundry work are better equipped to learn classroom fundamentals and consequently will be better grounded when called upon to assume responsibility in industry.

Program Benefits All Foundries

Foundries of all sizes have need for a program to be followed in attaining the maximum benefit from employing college engineering students. There is a tendency to think that such programs are necessary only in large foundries but, in fact, larger plants are likely to have less need for this method of introducing "new blood" with supervisory and technical backgrounds because they have been hiring trained engineers for many years. Some of the most successful participants in the four-point program outlined below have been plants employing less than 200 men:

1. Maintain contact by personal visits to the nearest engineering college having students interested in making the foundry their life work. The foundry executive can thus meet both students and faculty and by personal interviews insure that men of the type he needs will be directed to his plant.

2. Appoint someone in the plant to act as a training director for student employees in order to insure that both students and the company receive maximum benefits from the plan.

3. In utilizing student engineers in summer work, try to rotate them from department to department.

4. Keep up contacts with those men employed by the company during summers and hire some of them for permanent jobs as the opportunity arises.

Some of the jobs in which engineering students may be used in the foundry are sand tester, inspector, revising pattern storage records, draftsman, survey of lighting and ventilating conditions and—most important—laborers and helpers. Students are well aware that they are not going to step into supervisory jobs immediately and welcome an opportunity to begin at the bottom of the foundry ladder. The engineering student is not afraid to work. Give him an opportunity to prove his worth to himself, his employer and the foundry industry!

A.F.S. President Horlebein To Head Metal Dealers' Convention Program

MAIN SPEAKER at the annual meeting of the Metal Dealers' Division, to be held in conjunction with the 37th Annual Convention of the National Association of Waste Material Dealers at the Waldorf Astoria Hotel, New York, will be A.F.S. National President Edwin W. Horlebein. Mr. Horlebein will head the Division's program March 14.

Other phases of the program will include discussion of proposed scrap metal specifications—"*Tariff*", by Sidney Danziger, H. Kramer & Co., Chicago; "*H. R. Bill No. 5327*," by C. V. Maudlin, Washington, D. C.; and "*Outlook in the Office of International Trade on Non-Ferrous Scrap Metals*," by Herbert Cullen.

Mr. Horlebein, in addition to being President of the American Foundrymen's Society, is a member of the Munitions Board Committee on Copper and Copper-Base Alloy and chairman of the Foundry Subcommittee on Brass and Bronze Castings. During the war he served as chairman of the OPA's Brass and Bronze National Advisory Committee.

URGENTLY NEEDED

VOLUME 56 (1948) TRANSACTIONS

Bound copies of this volume in good condition will be purchased by A.F.S. Headquarters. Members who have no further use for their copies are urged to write The Secretary, American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5.

Letters to the Editor

All letters of broad interest which do not violate A.F.S. policy or good taste are publishable. Write to The Editor, American Foundryman, 616 S. Michigan Ave., Chicago 5, Ill. Letters must be signed but will be published anonymously on specific request.

Likes Containers Or Clam Shell For Coke Handling

Since sending suggestions for coke handling to minimize breakage (AMERICAN FOUNDRYMAN, November, 1949, Letters to the Editor, page 63.) we have made further investigation and have almost come to the conclusion that if coke cannot be handled by containers, the motor driven clam shell bucket might be next best.

More expensive coke handling systems using track hopper, with feeder and belt conveyors feeding into buckets or elevator for placing in the coke bin, are justified in some cases. However, even these systems cause breakage, possibly equal to that caused by a clam shell bucket. It has been observed that if the clam shell bucket is of sufficient capacity, the breakage of coke is held to a minimum. And the equipment is less expensive.

We would like to have some opinions from coke producers and companies using clam shell buckets or conveyor systems.

FRANK FONES, *Edry. Equip. Div.*
Whiting Corporation
Harvey, Ill.

Prompted by correspondence appearing in Letters to the Editor a coke handling system designed and built by Lakey Foundry & Machine Co. is described and illustrated on page 27 of this issue.—Ed.

Non-Destructive Testing Methods Complementary

We have noted with interest the article "*Radiography in the Steel Foundry*" by R. M. Landis, General Electric X-Ray Corp., in the January, 1950, issue of AMERICAN FOUNDRYMAN. He appears to have done an excellent job and it is interesting that his presentation is parallel to our point of view regarding best inspection methods for the foundry. His paper describes many of the fine jobs which can be done with x-ray, and also lists the definite limitations which radiography has for extremely fine defects—especially of a surface crack nature.

This is directly compatible with the general point of view of many foundrymen that magnetic particle inspection and radiographic inspection complement each other quite nicely. This is especially true on the steel castings which are the subject of Mr. Landis' paper. Ease of operation and reliability of magnetic particle inspection are excellent for fine surface defects such as cracks. As the x-ray becomes more sensitive for sub-surface defects, especially of spherical or similar shape, the sensitivity of magnetic particle inspection for that type of defect decreases. However magnetic inspection can locate sub-surface crack-type defects which x-ray might miss.

Completely rounded steel foundry inspection with full effectiveness and best quality will exist where both x-ray and magnetic particle inspection are used.

F. S. CATLIN, *Tech. Coord.*
Magnaflux Corp.
Chicago

3-inch Cupola Used All Over

Enclosed is a list of persons who have requested blueprints of our three-inch cupola. ("*Three-inch Cupola Aids Study of Carbon Absorption*," AMERICAN FOUNDRYMAN, May, 1949, page 62). This will give you some idea of the wide coverage of "The Foundrymen's *Own* Magazine." Some of the letters were very flattering, several going so far as to say our article was the year's most outstanding contribution to the industry.

Some small foundries are using the three-inch cupola as a pilot plant and in Australia they are using it as a laboratory tool in evaluating the efficiency of foundry cokes.

FRED C. BARBOUR, *Chief Chem.*
McWane Cast Iron Pipe Co.
Birmingham, Ala.

Dr. Barbour's list includes 20 United State foundries of all sizes, 15 universities, research institutes, and individuals, and requests from England, Italy, Belgium, New Zealand, and Australia. His offer to provide blueprints on request still stands.—Ed.

Invitation From Ireland

Every foundry in Ireland is fully occupied and order books are filled well into the future. Some of the foundries (including ourselves) are increasing their facilities and we are working on a scheme to semi-mechanize certain molding operations and sand conditioning.

Raw materials, particularly scrap and coke, while not abundant are being made available in sufficient quantity to maintain high production. Unfortunately, however, since our last communication (AMERICAN FOUNDRYMAN, September, 1949, page 69) the British Board of Trade stopped the export of pig iron to this country and we have had again to resort to purchasing from the Continent, particularly France. The change came rather suddenly and we do not know how long the embargo will last.

No doubt some A.F.S. members have planned to visit Europe in connection with the Holy Year ceremonies in Rome. Should any of them include Ireland in their itinerary I would like to extend to them—on behalf of the Irish Ironfounders' Association—a hearty welcome to call upon me or on any member of the Committee.

S. W. AITKEN, *Director*
Hammond Lane Ironfounders Ltd.
Dublin, Ireland

Agrees Foundry Industry Needs Creative Selling

Bruce L. Simpson, National Engineering Co., is to be highly complimented for his article "*Castings Can Do It Better!*" (AMERICAN FOUNDRYMAN, January, 1950, page 34). The theme Creative Selling is well covered and very clear.

The Steel Founders' Society recognized this situation some two years ago and organized what is presently known as the Product Development Committee of which I am a member. In the early stages of our work we recognized the need for creative selling and have worked continuously to make the industry conscious of the situation. It takes time to change an industry from an old accepted custom to a new one involving a new approach and merchandising method.

The excellent illustrations in the article bring out this point and show what can be done with castings over substitute products.

I feel I can speak on behalf of the Products Development Committee in expressing grateful thanks for Mr. Simpson's effort and interest in our common problem. If we can be helpful on such matters that may rise in the future we will be more than happy to do so.

N. K. ANDERSON, *Pres.*
Alloy Steel & Metals Co.
Los Angeles

New AFS MEMBERS

NEW COMPANY MEMBERS

Dion Freres, Inc., Ste. Therese, Que., Canada—Paul Dion, Secy. (Eastern Canada Chapter)—Conversion from Personal.

Howard Foundry Co., Chicago—Frank C. Howard (Chicago Chapter).

Kaiser Steel Corp., Los Angeles—M. H. Howard, Asst. Mgr., By-Products Sales (Southern California Chapter).

BIRMINGHAM CHAPTER

Lehman A. De Shazo, Coke Engr., Debardeleben Coal Corp., Birmingham, Ala.

CENTRAL ILLINOIS CHAPTER

Robert J. Missen, Edv. Appr., Caterpillar Tractor Co., Peoria, Ill.

CENTRAL INDIANA CHAPTER

Gerald A. Dawson, Gen. Fmn., National Malleable & Steel Castings Co., Indianapolis.
Harry Hosier, Fmn., Hoosier Iron Works, Kokomo, Ind.
Glen McCarter, Fmn., Hoosier Iron Works, Kokomo, Ind.
Fred E. Miller, Production Mgr., Electric Steel Castings Co., Indianapolis.
Philip A. Newhart, Melting Dept. Head, Perfect Circle Corp., Newcastle, Ind.
Fred Schwier, Gen. Fmn., Core Dept., National Malleable & Steel Castings Co., Indianapolis.
Lloyd W. Sheta, Sales Mgr., Hoosier Iron Works, Kokomo, Ind.
Herman A. Worrell, Finishing Supt., National Malleable & Steel Castings Co., Indianapolis.

CENTRAL MICHIGAN CHAPTER

Ernest O. Sundelius, Finishing Supt., Albion Malleable Iron Co., Albion, Mich.

CENTRAL OHIO CHAPTER

Wilbur Leo Bennett, Fmn., Superior Engine Div., National Supply Co., Springfield, Ohio.

CHICAGO CHAPTER

William C. Bay, Pres., Core Oil Div., Chicago Heights Paint & Varnish Co., Chicago Heights, Ill.
Martin J. Becatti, Sales, Western Foundry Co., Chicago.
Frank J. Biener, Sales, Western Foundry Co., Chicago.
G. Courtney Chapman, Student, University of Illinois, Chicago.
Wilfred B. Colmar, Sales, Western Foundry Co., Chicago.
William D. Danks, Chief Met., Howard Foundry Co., Chicago.
H. B. Hoge, Fmn., Western Foundry Co., Chicago.
Howard Foundry Co., Chicago, Frank C. Howard.
F. J. Lukowitz, Edv. Supv., Western Electric Co., Chicago.
Edgar W. Moir, Gen. Fmn., Howard Foundry Co., Chicago.
August E. Petersen, Metal Pattern Fmn., Howard Foundry Co., Chicago.
Donald G. Schmidt, Met. Engr., H. Kramer & Co., Chicago.
John Smith, Jr., Edv. Engr., Western Electric Co., Chicago.
John Tracy, Western Foundry, Chicago.
Raymond A. Werle, Fmn., Western Foundry Co., Chicago.
James J. Wiley, Pattern Dept., Howard Foundry Co., Chicago.

CINCINNATI CHAPTER

William George Probst, III, Foundry Supt., C. Lee Cook Co., Louisville, Ky.

DETROIT CHAPTER

Earl W. Graham, Dist. Repr., Dust Control, American Air Filter Co., Detroit.
William E. Hopkins, Student, University of Michigan, Ann Arbor, Mich.
Roy E. Mahs, Asst. Fmn., Riley Stoker Co., Detroit.
Ferdinand F. Rotrock, Plant Layout Engr., Ford Motor Co., Detroit.
Ralph L. Terry, Asst. Edv. Fmn., Riley Stoker Corp., Detroit.
Raymond R. Woods, Fmn., Pontiac Motor Div., General Motors Corp., Detroit.
John R. Vogt, Asst. Met., Bohn Aluminum & Brass Corp., Detroit.

EASTERN CANADA CHAPTER

William Davis, Edv. Supt., Union Screen Plate Co. of Canada, Lennoxville, Que.
Philip J. Hebert, Buyer Raw Material, Canadair Ltd., Montreal, Que.
P. Rene Piche, Joliette Steel, Ltd., Joliette, Que.

EASTERN NEW YORK CHAPTER

Eugene C. Santoro, Student, Rensselaer Polytechnic Institute, Troy, N. Y.

METROPOLITAN CHAPTER

George W. Fry, Mgr., Mech. Buying Sect., Purch. Div., Radio Corp. of America, Camden, N. J.
Vincent Lally, Masonite Corp., New York.
Thomas M. O'Neil, Mgr., Chemical Div., Masonite Corp., New York.

MEXICO CITY CHAPTER

Florentino Moral, Mexico, D. F., Mexico.
Juan Latapi Sarre, Ingeniero Mecanico Electricista, S. Fundiciones De Hierro Y Acero, S. A., Los Pinos, D. F., Mexico.

MICHIANA CHAPTER

William B. Misch, Ind. Engr., Weil-Mc Lain Co., Michigan City, Ind.
John G. Rush, Edv. Supt., Globe Valve Corp., Delphi, Ind.

MO-KAN CHAPTER

Kermit Oswalt, Student, Kansas University, Lawrence, Kan.

NORTHEASTERN OHIO CHAPTER

William W. Clark, III, Core Room Supt., Ferro Machine & Foundry, Inc., Cleveland.
Raymond L. Collier, Exec. Vice-Pres., Gray Iron Founders' Society, Inc., Cleveland.
James J. Martin, Pres., Royal Pattern, Cleveland.
Anthony Joseph Totok, Sr., Owner, Continental Pattern Works, Cleveland.

NORTHERN CALIFORNIA CHAPTER

Ray A. Jerome, Abrasive Engr., Pacific Grinding Wheel Co., Oakland, Calif.

NORTHERN ILLINOIS-SOUTHERN WISCONSIN CHAPTER

Allan H. Partch, Pattern Div. Supt., Greenlee Bros. & Co., Rockford, Ill.
Wayne W. Williamson, Appr. Patternmaker, Pattern Div., Greenlee Bros. & Co., Rockford, Ill.

ONTARIO CHAPTER

Walter C. Breach, Plant Supt., Belleville Lock Co., Belleville, Ont.
Roland L. Lucien, Mgr., Foundry Services (Canada) Ltd., Toronto, Ont.
Wilbert Starr, Edv. Fmn., Peterborough Lock Mfg. Co., Peterborough, Ont.

OREGON CHAPTER

Albert A. Freeman, Supt., Service Bronze & Brass Works, Portland, Ore.

PHILADELPHIA CHAPTER

Harry A. Coady, Salesman, Joseph Dixon Crucible Co., Jersey City, N. J.
Francis J. Kelman, Sales Mgr., General Grinding Wheel Corp., Philadelphia.
Jack W. Snook, Sales Engr., General Grinding Wheel Corp., Philadelphia.

QUAD CITY CHAPTER

James C. Boone, Chief Inspector, J. I. Case Co., Bettendorf, Iowa.
C. C. Robertson, Gen. Ptn. Fmn., J. I. Case Co., Bettendorf, Iowa.

ROCHESTER CHAPTER

Arthur Lochte, American Laundry Machinery Co., Rochester, N. Y.

SOUTHERN CALIFORNIA CHAPTER

Kaiser Steel Corp., Los Angeles, M. H. Howard, Asst. Mgr., By Products Sales.
Jonmore Dickason, Vice Pres. & Gen. Mgr., Metal Control Laboratories, Los Angeles.
Thomas R. Marko, Edv. Fmn., Reliance Regulator Div., American Meter Co., Los Angeles.
H. T. Riley, Sales Mgr., Miller Bros. Truck Co., Huntington Park, Calif.
Frank Pellegrino, Co-Owner, Monarch Aluminum Casting Co., South Gate, Calif.
A. H. Popperwell, Vice-Pres., Reliable Iron Foundry, Inc., Los Angeles.

TENNESSEE CHAPTER

Wallace Erb, Gen. Fmn., U. S. Pipe & Foundry Co., Chattanooga, Tenn.
Bernus E. Howard, Sand Control Supv., U. S. Pipe & Foundry Co.

TOLEDO CHAPTER

R. W. Furman, Sales Repr., E. F. Houghton & Co., Toledo, Ohio.

WESTERN MICHIGAN CHAPTER

Alex Avram, Gen. Fdy. Supt., P. Wiener Foundry, Muskegon, Mich.
Roger Kops, Owner, Roger's Sawmill, Muskegon, Mich.

WESTERN NEW YORK CHAPTER

Martin J. Kermer, Maint. Engr., American Radiator & Standard Sanitary Corp., Buffalo.
John H. Morton, Supt. of Fdrs., American Radiator & Standard Sanitary Corp., Buffalo.

WISCONSIN CHAPTER

George William Buhs, Student, International Harvester Co., Milwaukee.
Joseph Dionne, Grede Foundries, Inc., Milwaukee.
Paul K. Dumbleton, Supt., General Malleable Corp., Waukesha, Wis.
Ferdinand Feiss, Grede Foundries, Inc., Milwaukee.
Ray Lee, Grede Foundries, Inc., Milwaukee.
Leonard J. Mueller, Lab. Tech., Falk Corp., Milwaukee.
Robert C. Remiker, Fdy. Supt., Universal-Rundle Corp., Milwaukee.

STUDENT CHAPTERS

MICHIGAN STATE COLLEGE

Wesley H. Hauschildt Robert E. Ressegnie R. Stanford Short

MISSOURI SCHOOL OF MINES

Willis Stanton Cady
William M. Harris
John P. McGowan
Edwin R. Szumachowski

OHIO STATE UNIVERSITY

Edward J. Bazel John D. Cecutti Garman A. Riechkhoff

OREGON STATE COLLEGE

Charles R. Litterback
Jack G. Croeni

UNIVERSITY OF ILLINOIS

Joe Joseph
James Carroll Murphy

OUTSIDE OF CHAPTER

Wayne L. Cockrell, AMIK-ECA I & M, San Francisco.
Eugene A. Fischer, Refr. Engr., Norton Co., Worcester, Mass.

INTERNATIONAL

Africa

Union Miniere du Haut Katanga, St. Bibliotheque, Belgian Congo, Africa.

Egypt

B. Armenian, Owner, B. Armenian, Cairo, Egypt.

England

Donald Arthur Oliver, Dir. of Research, William Jessop & Sons, Ltd., Sheffield.
Govind Singh, Student, National Foundry College, Wolverhampton, England.

Italy

Bruno Bearzi, Perito Industrial, Fonderia Artistica Cav. Bruno Bearzi, Florence.
Carlo Maria Pensotti, Dr. Ingegnere, Ditta Mario Pensotti, Milano.
Dott. Ing. Vaccari Pietro, Ingegnere, Compagnia Italiana Westinghouse, Torino.

Spain

Nicolis Fuster, Madrid.
L. Jose de Torrontegui, Counsellor & Dir., Sociedad Espanola De Construcciones, Bilboa.

Turkey

Enver Eke, T. H. K. Motor Fabrikasi, Maltepe-Ankara.

Gray Iron Research Institute Moves

EFFECTIVE AT ONCE the new address of the Gray Iron Research Institute, Inc., is 1300 Grandview Ave., Columbus 12, Ohio. The Institute was formerly located at 43 West Long St., Columbus 15.

New England Founders Elect 1950 Officers, Directors At Annual Meet

ELECTION OF OFFICERS climaxed the 54th Annual Meeting of the New England Foundrymen's Association, held January 11 at the Parker House, Boston, Mass. Other highlights, in addition to business sessions, were a dinner and entertainment.

Newly-elected officers are: *president*, Thomas I. Curtin, Waltham Foundry Co., Waltham, Mass.; *vice-president*, Robert C. Walker, Whitin Machine Co., Whitinsville, Mass.; *treasurer*, Arthur W. Gibby, East Boston, Mass.; and *secretary*, Ernest F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass.

Elected to the Association's Executive Committee were: Frank R. Elliott, Westinghouse Electric Corp., Springfield, Mass.; Joseph B. Stazinski, General Electric Co., Lynn, Mass.; Gordon L. Paul, Browne & Sharpe Mfg. Co., Providence, R. I.; Henry G. Stenberg, Draper Corp., Hopedale, Mass.; and Charles A. Reed of Cambridge, Mass.

Malleable Founders Society To Hold Two-Day Market Development Meet

NORTHWESTERN UNIVERSITY, Evanston, Ill., will be host to a Market Development Conference March 22 and 23, sponsored jointly by the Malleable Founders Society and Northwestern University's Technological Institute, it was announced at the Malleable Founders' Society's Semi-Annual Meeting, held recently.

The Conference will consist of classes from 9:00 a.m. to 4:30 p.m. both days, with luncheon meetings and a banquet. There will be talks on the characteristics, limitations and applications of malleable iron given by design engineers, castings buyers and industry representatives. Features of the Conference will be a typical sales interview illustrating constructive selling methods and a session reporting analysis of malleable foundry marketing problems based on studies undertaken by the Northwestern University School of Commerce. Banquet speaker will be Eugene Mapel, vice-president in charge of the Sales Consulting Division of the Methods Engineering Council, Pittsburgh, who will speak on salesmanship.

Steel Founders Hold Regional Meet

MEETING JANUARY 26 at the Hotel Statler, Buffalo, more than 75 steel foundry executives, members of the Management and Technical Operating Groups of Division 2, Steel Founders Society of America, discussed plans for intensive research and product development activities as a means of improving manufacturing processes and lowering costs.

Principal speakers were SFSA Executive Vice-President F. Kermit Donaldson, William J. Phillips and John E. Mullen, National Erie Corp., Erie, Pa.

Mr. Donaldson presented a factual summary of current developments in the steel castings industry and reported on SFSA activities. A special session was devoted to a product analysis made jointly by Messrs. Donaldson and Phillips.

WHO'S WHO

T. F. Butler

Thomas F. Butler, author of "*Planning Foundry Preventive Maintenance.*" Page 47, is foundry plant engineer for the Ford Motor Co., Dearborn, Mich. . . . After attending the University of Kentucky, Mr. Butler joined the Lucius Engineering Co., Pittsburgh, as a draftsman in 1913, leaving there to become a draftsman and field engineer with the American Bridge Co., Pittsburgh, for seven years . . . He has been with the Ford Motor Co. since 1922 . . . Mr. Butler has spoken before several A.F.S. chapters on the subject of preventive maintenance.

T. G. Kennard

Correct photograph of Theodore G. Kennard, who with John E. Drake authored "*Closed Top System in Cupola Stack Emission Control.*" (February, Page 55) appears at right . . . Last month's "Who's Who" carried a photograph of George L. Kennard by mistake . . . Both Kennards are Californians. Author T. G. being partner in the firm of Kennard & Drake, Los Angeles, and G. L. an executive of the Industrial Association of San Francisco and one-time secretary-treasurer of the A.F.S. Northern California Chapter.

W. G. Stanton

Wyllys G. Stanton, author of "*Summer Foundry Work for Student Engineers.*" Page 60, is a registered professional engineer and associate professor of industrial engineering at Ohio State University . . . A graduate of Yale University's Sheffield Scientific School (1926) and holder of a master's degree from Washington University (1936), Mr. Stanton was for seven years chief of Planning Division for the St. Louis Farm Credit Administration and the Ralston Purina Co. . . . During World War II, Mr. Stanton held the rank of Lieutenant Colonel of Ordnance, serving as Ordnance Procurement Officer in Oklahoma and Texas, and later in England and France as Ordnance Staff Officer and depot and battalion commander . . . Mr. Stanton is executive secretary of the American Institute of Industrial Engineers, chairman of the Employment Conditions Committee of the Ohio Society of Professional Engineers, and a past national director of the Society for the Advancement of Management.

W. A. Hallberg

W. A. Hallberg, author of "*Foundry-Coke—from Car to Charging Floor by Bucket Elevator.*" Page 27, is foundry engineer and metallurgist for the Lakey Foundry & Machine Co., Muskegon, Mich. . . . Interrupting his schooling to enlist in the Army in World War I, Mr. Hallberg was discharged with the rank of sergeant and attended Western Michigan College and the University of Michigan . . . Beginning as a chemist with Continental Motors Corp. in 1922, Mr. Hallberg has held executive chemical and metallurgical positions in several Michigan foundries . . . During World War II, he was chief metallurgist in charge of three plants producing war material . . . In 1941, Mr. Hallberg joined Lakey Foundry & Machine Co. in his present position. Active for many years in A.F.S., Mr. Hallberg is immediate past chairman, Western Michigan Chapter.

Dr. Hugh O'Neill

Dr. Hugh O'Neill, whose "*Metalfounding Through the Ages.*" Page 50, was the 1949 Edward Williams Lecture of the Institute of British Foundrymen, is professor of metallurgy at University College, Swansea, Wales . . . One of Great Britain's most noted authorities on metallurgy and its history, Dr. O'Neill holds an M.Met. from the University of Sheffield and a D.Sc. from the University of Manchester . . . Since 1920 he has been lecturer in metallurgy at Birmingham Technical College and the University of Manchester, chief metallurgist for the LMS Railway Co. (1934-47) and since 1947 professor of metallurgy at University College . . . Author of *Hardness of Metals and Its Measurement*, published in 1934, Dr. O'Neill has delivered more than 50 talks before British metals technical societies . . . He is vice-president of the British Institution of Metallurgists, council member and chairman of the British Institute of Metals Publication Committee.

British Aluminum Melting Practice Booklet Available

Designed to help the practical foundryman understand the melting and preparation of aluminum alloys, *Melting Practice for the Production of Aluminum Alloy Castings*, published by England's Association of Light Alloy Refiners, is available free of charge to interested foundrymen.

Useful as a tool of instruction for non-technical foundry workers or newcomers to aluminum alloy casting, the booklet deals mainly with production of sand castings and gravity die-castings, covering molten alloy characteristics, furnaces and equipment, melting precautions, temperature control and measurement, grain refinement, fluxing, degassing and modification of aluminum casting alloys.

Copies are available at no charge from Alar, Ltd., 3 Albemarle St., London W. 1.

Aluminum Association Elects 1950-51 Officers

Annual meeting of the Aluminum Association, held January 17-19 in New York, featured election of 1950-51 officers and directors and divisional chairmen.

Elected president of the Association was R. S. Reynolds, Jr., Reynolds Metals Co., Richmond, Va. The following were elected vice presidents: E. G. Grundstrom, Advance Aluminum Castings Corp., Chicago; M. E. Rosenthal, United Smelting & Aluminum Co., Inc., New Haven, Conn.; and G. N. Wright, John Harsh Bronze & Foundry Co., Cleveland. A. V. Davis, Aluminum Co. of America, New York, was re-elected chairman of the board and Donald M. White was reappointed secretary-treasurer. John T. Watry, Aluminum Casting & Engineering Co., Milwaukee, was elected chairman of the Aluminum Association's Foundry Division.

FOUNDRY Personalities

Leon F. Miller, for the last six years sales manager of the Osborn Mfg. Co., Cleveland, has been elected vice-president

L. F. Miller

in charge of sales and engineering for Osborn's Foundry Machinery Div. A graduate of the Case Institute of Technology, Mr. Miller joined Osborn in 1929. He is a past director of the Northeastern Ohio Chapter of A.F.S.

Marshall H. Jones has been elected president of the Globe Iron Co., Jackson Ohio, succeeding his brother, **Edwin A. Jones,** who has been elected chairman of the

M. H. Jones

company's Board of Directors. **James W. Morgan** was named vice-president, **Winston Pfancuff** assistant secretary and **Charles F. Chapman** will continue as secretary-treasurer. Marshall H. Jones, the new president, is a great-grandson of the company's founder Thomas L. Jones. Re-elected members of Globe Iron's Board of Directors are **Edwin A. Jones, Marshall H. Jones, Charles P. Chapman, James W. Morgan, Brooks M. Jones, Wm. McK. Davis and T. R. Davis.**

John C. Hamaker, Jr., who recently completed research work toward a Ph.D. in metallurgical engineering at the University of Michigan under an International Nickel Co. fellowship, has joined Foundry Services, Inc., as a sales engineer in the company's Cleveland area. Mr. Hamaker was formerly employed by the Rotary Electric Steel Co. as a metallographic assistant and by the International Nickel Co. as a junior research engineer.

Wearing the traditional lei of welcome as they stepped into the lobby of the Royal Hawaiian Hotel in Honolulu recently were Mr. and Mrs. John R. Russo. Mr. Russo, who heads the Russo Foundry Equipment Co., Oakland, Calif., and is vice-president of the A.F.S. Northern California Chapter, combined business and pleasure on an air-sea tour of Hawaiian Islands.

William F. Cutler, vice-president, American Brake Shoe Co., has accepted chairmanship of the Railway Supplies Division of the Legal Aid Society's 1950 campaign. The Legal Aid Society is a non-profit organization offering free legal service to more than 40,000 persons a year who cannot afford private attorneys' services.

Cecil E. Bales has been elected president of the Ironton Fire Brick Co., Ironton, Ohio, succeeding **E. F. Myers,** who has been elected chairman of the Board of Directors and treasurer of the company. Engaged in the technical development of

C. E. Bales

foundry refractories for some 30 years, Mr. Bales has been an active member of the A.F.S. Refractories Committee for several years. A past president of the American Ceramic Society and the Ohio Ceramic Industries Association, Mr. Bales is currently a director of the American Refractories Institute.

J. F. B. Jackson has been appointed director of research for the newly-formed

J. F. B. Jackson

Research and Development Division of the British Steel Founders' Association. Mr. Jackson in his new capacity will bridge the gap between scientific knowledge and its practical application to steel foundry practice in Great Britain. Formerly chief metallurgist and technical controller of foundries for David Brown

& Sons, Huddersfield, one of England's largest steel foundry organizations. Mr. Jackson carried out that company's research and development policies, correlating them with their commercial applications. Holder of a B.Sc. with honors in metallurgy from the Victoria University of Manchester, Mr. Jackson has for several years been active on technical committees of the British Steel Founders' Association and the British Iron and Steel Research Association. He is a fellow of the Institution of Metallurgists and an associate of the Royal Institute of Chemistry.

J. M. Spangler

J. M. Spangler, who during his 35 years of service with the National Carbon Div., Union Carbide & Carbon Corp., has been director, vice-president and general manager, was recently appointed Division president. Mr. Spangler has been with National Carbon since 1915.

J. B. Caine

John B. Caine, director of research for the Sawbrook Steel Castings Co., Lockland, Cincinnati, recently resigned to establish his own business as a technical consultant on casting problems, specializing in gating and risering. Mr. Caine is a member of the Executive Committee of the A.F.S. Sand Division, chairman of its Mold Surface Committee and a member of the Sand Division Program and Papers Committee and the A.F.S. Heat Transfer Committee. Mr. Caine has been a frequent speaker at local, regional and national

(Continued on Page 87)

A. F. S. CHAPTER DIRECTORY

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CENTRAL NEW YORK CHAPTER *Secretary,* William D. Dunn, 432 Buckingham Ave., Syracuse, N. Y.

CENTRAL OHIO CHAPTER *Secretary,* D. E. Krause, Gray Iron Research Institute, 1532 Cardiff Rd., Columbus, Ohio

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NORTHEASTERN OHIO CHAPTER *Secretary,* A. J. Harlan, Hickman, Williams & Co., 1154 Union Commerce Bldg., Cleveland, O.

NORTHERN CALIFORNIA CHAPTER *Secretary,* Charles R. Marshall, 90 Second St., San Francisco

NORTHERN ILLINOIS-SOUTHERN WISCONSIN *Secretary,* Carl L. Dahlquist, 120 So. Highland, Rockford, Ill.

NORTHWESTERN PENNSYLVANIA CHAPTER *Secretary,* Earl Strick, Erie Malleable Iron Co., Erie, Pa.

ONTARIO CHAPTER *Secretary-Treasurer,* G. L. White, Westman Publications, Ltd., 137 Wellington St. W., Toronto, Ont., Canada

OREGON CHAPTER *Secretary-Treasurer,* Harry K. McAllister, 627 S. E. 71st Ave., Portland, Ore.

PHILADELPHIA CHAPTER *Secretary-Treasurer,* W. B. Coleman, W. B. Coleman & Co., 9th and Rising Sun Ave., Philadelphia

QUAD CITY CHAPTER *Secretary-Treasurer,* C. R. Matthens, Matthens Co., 3094 16th St., Moline, Ill.

ROCHESTER CHAPTER *Secretary-Treasurer,* Leon C. Kimpal, Rochester Gas & Electric Corp., 89 East Ave., Rochester, N. Y.

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ST. LOUIS DISTRICT CHAPTER *Secretary,* P. E. Retzlaff, Busch Sulzer Bros.-Diesel Engine Co., Div., Nordberg Mfg. Co., 5300 S. Second St., St. Louis

SOUTHERN CALIFORNIA CHAPTER *Secretary,* Harold G. Pagenkopp, Angelus Pattern Works, 2084 Belgrave Ave., Huntington Pk., California

TENNESSEE CHAPTER *Secretary-Treasurer,* Herman Bohr, Jr., Robbins & Bohr, Chattanooga Bank, Chattanooga, Tenn.

TEXAS CHAPTER *Secretary,* P. B. Cuoon, 5210 Canal, Houston, Texas

TIMBERLINE CHAPTER *Secretary,* James Schmuck, Rotary Steel Castings Co., 1425—5th St., Denver, Colorado

TOLEDO CHAPTER *Secretary-Treasurer,* R. C. Van Hellen, Unitcast Corp., Box 8, Station E, Toledo, Ohio

TRI-STATE CHAPTER *Secretary,* D. A. Mitchell, Progressive Brass Co., 1702 East 6th, Tulsa, Okla.

TWIN-CITY CHAPTER *Secretary-Treasurer,* Lillian K. Polzin, Minneapolis Chamber of Commerce, 1750 Hennepin at Groveland Terrace, Minneapolis

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WESTERN MICHIGAN CHAPTER *Secretary,* Ross Shaffer, Lakey Foundry & Machine Co., First and Water Sts., Muskegon, Mich.

WESTERN NEW YORK CHAPTER *Secretary,* R. E. Walsh, Hickman, Williams & Co., 32 Eastwood Place, Buffalo, N. Y.

WISCONSIN CHAPTER *Secretary,* G. E. Tisdale, Zenith Foundry Co., 1501 So. 83rd St., West Allis, Wis.

STUDENT CHAPTERS

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UNIVERSITY OF ILLINOIS *Secretary,* Eugene Keith Van Ness

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UNIVERSITY OF MINNESOTA *Secretary-Treasurer,* Delbert N. LeClair

MISSOURI SCHOOL OF MINES *Secretary,* Ralph E. Johnston

OHIO STATE UNIVERSITY *Secretary-Treasurer,* Charles J. Weiland

OREGON STATE COLLEGE *Secretary,* Leonard M. Preston

TEXAS A & M COLLEGE *Secretary,* R. L. Jones

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Whiting Corp.
Harvey, Ill.
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Chicago Chapter

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American Manganese Bronze Co.
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Director
Philadelphia Chapter

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La Consolidada, S. A.
Mexico, D.F.
Secretary-Treasurer
Mexico City Chapter

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Michigan Steel Castings Co.
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Amer. Wheelabrator & Equip. Corp.
Houston, Texas
Director
Texas Chapter

V. S. Spears
Amer. Wheelabrator & Equip. Corp.
Mishawaka, Ind.
Chairman
Michiana Chapter

Members of the University of Illinois Student Chapter dined in the cafeteria of the Central Foundry

Division, General Motors Corp., Danville, Ill., during a conducted evening foundry tour, January 12.

CHAPTER ACTIVITIES NEWS

Texas

E. P. Clarke
American Wheelabrator & Equip. Corp.
Chapter Reporter

SIXTY MEMBERS and their guests attended the January 20 meeting, held at the Blackstone Hotel, Fort Worth. Honored guest at the meeting was A.F.S. National Past President (1906-07) W. H. McFadden.

Chapter Chairman Charles McGrail, Texaloy Foundry Co., San Antonio, welcomed members and guests and turned the meeting over to Chapter Vice-Chairman W. H. Lyne, III, Hughes Tool Co., Houston, who in turn presented the speaker of the evening, A.F.S. Technical Director S. C. Massari, Chicago.

Mr. Massari provided a running commentary on the A.F.S. Aluminum & Magnesium Division-sponsored film, "*Fluid Flow in Transparent Molds*," showing result of research undertaken at Battelle Memorial Institute, Columbus, Ohio. A lively question-and-answer period followed, with Mr. Massari on the answer end.

Michigan State College

Fred W. Schwier
Chapter Secretary-Treasurer

NEWLY-ORGANIZED Michigan State College Student Chapter met January 26 to plan an "organization" dinner, to be held early in April. Speaker of the evening was Clyde A. Sanders, American Colloid Co., Chicago, who spoke on opportunities for the engineering college graduates in the foundry.

University of Illinois

Dale Besterfield
Corresponding Secretary

A TOUR of the General Motors Corp.'s Central Foundry Division at Danville, Ill., was the highlight of the Student Chapter's December 12 meeting.

Following a reception given by the Division's administrative staff, students were taken on a guided tour of the testing and control laboratory and the plant proper, where operations were shown in a sequence paralleling that of actual production.

First, students watched coremaking operations, then saw sand molds prepared. After watching a cupola being charged with iron, coke and limestone, students saw the molten iron being tapped from ladles and witnessed pouring operations.

From there Chapter members followed the castings through shakeout operations, cooling, cleaning, grinding and storing. Other operations witnessed were plant maintenance, oven-temperature controls and the work of the safety and sanitation departments.

Following dinner in the plant cafeteria and a get-together of students and Division personnel, a showing of the Malleable Founders' Society film, "*This Moving World*," concluded the tour, which proved an effective means

William G. Clark, laboratory technician, (white shirt) instructs students in the art of cupola tapping at the University of Illinois foundry.

of acquainting student foundry engineers with the practical workings of a large foundry operation.

St. Louis District

Norman L. Peukert
Carondelet Foundry Co.
Chapter Director

JANUARY 12 MEETING, attended by 120 members and their guests, featured as speaker of the evening Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., who spoke on *"What's Ahead for the Foundry Industry."*

Stressing the importance of nodular iron to the foundry industry, Mr. Kuniansky related Lynchburg Foundry Co.'s experiences in the production of this new development. Good control

Speaker at the January meeting of the Wisconsin Chapter was S. C. Massari, A.F.S. Technical Director, who provided a running commentary on the A.F.S. film, "Fluid Flow in Transparent Molds." (Photo courtesy W. V. Napp, Badger Firebrick & Supply Co., Milwaukee)

is essential, he said, and analysis of base iron must be known before treatment can be successful.

Molding technique, Mr. Kuniansky said, differs from gray iron but is similar to that for malleable iron. The speaker was very strong in his warning against misapplication of the new product and said that in his opinion there is still insufficient service information to warrant its extensive production. Nodular iron, Mr. Kuniansky concluded, has taken a definite place as an engineering metal and is an addition to present metals, not a replacement.

Mr. Kuniansky, who also presented his talk before the Missouri School of Mines Student Chapter at Rolla, showed Lynchburg Foundry Co.'s new film, *"Men and Molds."*

FUTURE CHAPTER

● **MARCH 14**
TWIN CITY
Covered Wagon, Minneapolis
R. P. SCHAUSS
Illinois Clay Products Co.
"Gating and Feeding of Castings"

● **MARCH 15**
CENTRAL MICHIGAN
American Legion Club, Battle Creek
CLYDE A. SANDERS
American Colloid Co.
"Progress in Foundry Sand Practice"

● **MARCH 17**
TEXAS
Beaumont, Texas
K. A. MIERICKE
Baroid Sales Div., National Lead Co.
"Insulated Risers" and film on plaster patterns.

NORTHWESTERN PENNSYLVANIA
Van Buren Inn, Dunkirk, N. Y.
DR. M. F. SIMONSEN
Fredonia College

DETROIT
Engineering Society of Detroit
CASTING DEFECT CLINIC

● **MARCH 20**
QUAD CITY
Ft. Armstrong Hotel, Rock Island, Ill.
L. P. ROBINSON
Werner G. Smith Co.
"Cutting Core Room Costs"

● **MARCH 22**
CENTRAL INDIANA
Athenaeum, Indianapolis
PAST CHAIRMAN'S NIGHT

● **MARCH 23**
MEXICO CITY
N. S. COVACEVICH
La Consolidada, S. A.
"Steel Castings"

● **MARCH 24**
CHESAPEAKE
Engineers' Club, Baltimore
E. C. TROY
Foundry Consultant, Palmyra, N. J.
"Steel"

TENNESSEE
Hotel Patten, Chattanooga
Films: *"Chaplets"* and *"Chills"*

● **MARCH 27**
NORTHWESTERN PENNSYLVANIA
Moose Club, Erie
HARRY H. KESSLER
Sorbo-Mat Process Engineers
"Control Specifications of Cast Iron"

● **MARCH 29**
WASHINGTON
Gowman Hotel, Seattle
L. P. ROBINSON
Werner G. Smith Co.
"Cores"

● **MARCH 31**
ONTARIO
Royal Connaught Hotel, Hamilton
E. F. KINDT
Kindt Collins Co.
"Patterns"

● **APRIL 3**
WESTERN MICHIGAN
Cottage Inn, Muskegon
DR. JACK T. WILSON
Allis-Chalmers Mfg. Co.
"Sand Properties and Casting Defects"

METROPOLITAN
Essex House, Newark, N. J.
NORMAN A. BIRCH
American Brake Shoe Co.
"Gating and Risering"

CENTRAL ILLINOIS
Jefferson Hotel, Peoria
MAX KUNIANSKY
Lynchburg Foundry Co.
"Nodular Iron"

CENTRAL INDIANA
Athenaeum, Indianapolis
QUESTION AND ANSWER SESSION

CHICAGO
Chicago Bar Association
C. K. DONOHO
American Cast Iron Pipe Co.
"Nodular Iron"

● **APRIL 5**
TOLEDO
Toledo Yacht Club
Speaker to be announced
"Customer Requirements"

Central Ohio

H. W. Lownie, Jr.
Battelle Memorial Institute
Chapter Reporter

FEBRUARY 13 MEETING featured an address by Dr. Douglas C. Williams, Ohio State University, on *"Sand."* Some 65 members and guests attended.

Dr. Williams pointed out that sand is defined as "a particle-size classification of nonmetallic minerals." Although foundrymen frequently think of silica sand as being synonymous with "sand", other materials such as limestone, zircon, and even coal or coke are sands if their particle sizes are suitable, he said.

The differences between naturally bonded sands and synthetic sands were pointed out. As soon as any additional bond or other material is added to a naturally occurring sand, it is no longer a naturally bonded sand. "Semi-synthetic" sands are considered to be a superfluous class. With any molding sand that has been altered from its

MEETING PROGRAMS

● *APRIL 6*
CANTON DISTRICT
Mergus Restaurant, Canton
HAROLD RANDOLPH
Mexico Refractories Co.
"Foundry Refractories"

SAGINAW VALLEY
Fischers' Hotel, Frankenmuth, Mich.
Speaker and subject to be announced

● *APRIL 8*
EASTERN CANADA
Mount Royal Hotel, Montreal
C. V. NASS
Beardsley & Piper Div.
"Better Methods for Producing Castings"

● *APRIL 10*
CENTRAL OHIO
Chittenden Hotel, Columbus
D. E. KRAUSE
Gray Iron Research Institute
"Fundamentals of Iron Metallurgy"
L. W. EASTWOOD
Battelle Memorial Institute
"Non-Ferrous Melting Practice"

CINCINNATI DISTRICT
Engineering Society, Cincinnati
CLYDE A. SANDERS
American Colloid Co.
"Modern Progress in Foundry Sand Practice"

● *APRIL 11*
ROCHESTER
Hotel Seneca, Rochester
DEFECTIVE CASTINGS CONTEST

N. ILLINOIS — S. WISCONSIN
B. C. YEARLEY
National Malleable & Steel Castings Co.
"Cracks and Tears in Ferrous Castings"

● *APRIL 13*
NORTHEASTERN OHIO
Tudor Arms Hotel, Cleveland
GROUP MEETINGS

● *APRIL 14*
EASTERN CANADA
Mount Royal Hotel, Montreal
HOWARD F. TAYLOR
Massachusetts Institute of Technology
"Non-Ferrous Metallurgy and Foundry Practice"

(APR. 14 CONT'D)
CENTRAL NEW YORK
Cornell University, Ithaca
TECHNICAL MEETING

PHILADELPHIA
Engineers' Club, Philadelphia
MAX KUNIANSKY
Lynchburg Foundry Co.
"Sand, Metal or Men"

WESTERN NEW YORK
Hotel Sheraton, Buffalo
Speaker and subject to be announced

SOUTHERN CALIFORNIA
Rodger Young Auditorium, Los Angeles
L. P. ROBINSON
Werner G. Smith Co.
"Cutting Core Room Costs"
Films: *"Gating Systems for Metal Castings"*, *"Finger Gating"* and *"Step Gating"*

● *APRIL 17*
QUAD CITY
Ft. Armstrong Hotel, Rock Island, Ill.
M. E. BROOKS
Dow Chemical Co.
"Nodular Iron"

● *APRIL 19*
CENTRAL MICHIGAN
American Legion Club, Battle Creek
W. B. MCFERRIN
Electro Metallurgical Div.
"Gray Iron Castings Defects"

● *APRIL 20*
DETROIT
Engineering Society, Detroit
J. W. SHAW
Detroit Dept. of Health
"The Foundry Neighborhood Air Pollution Problem"

● *APRIL 21*
TEXAS
E. A. CLINE
American Steel Abrasive Co.
"Maintenance of Shotblast Equipment"

● *APRIL 28*
CHESAPEAKE
Engineers' Club, Baltimore
R. A. QUADT
"Aluminum Foundry Practice"

natural condition, the term synthetic is being used. It is considered unfortunate that the word "synthetic" was ever adopted for molding sands. Dr. Williams feels that "compounded" would be a better term.

The Bouyoucos-hydrometer method of determining particle-size distribution was described as an improvement over the A.F.S. washing method. Milford silt was used as an example of a sand which yields widely divergent results in the A.F.S. clay-washing tests and the hydrometer tests. In the washing test, Milford silt shows about 85 per cent "A.F.S. clay". Hydrometer data show that only about three per cent of the material is finer than two microns. Since only material finer than about two microns contributes bonding power, the A.F.S. clay determination can be misleading.

The A.F.S.-Battelle movie, *"Fluid Flow in Transparent Molds"* was also shown during the meeting. J. H. Jackson, Battelle Memorial Institute, supplied the narration during the film. Mr. Jackson had an active part in the preparation of the film and was well qualified to explain the significance of the film in detail.

Cincinnati District
John F. Kahles
University of Cincinnati
Chapter Reporter

FEBRUARY 13 MEETING, held at Engineering Society Headquarters, featured three colored sound motion pictures presented by William H. Johnson, Naval Research Laboratory, Washington, D.C., and covering the effect of various gating systems on the flow of molten steel.

The first film, *"Gating Systems for Metal Casting,"* showed that many gating systems are inadequate. The other films, *"Finger Gating,"* and *"Step Gating,"* suggested improvements which would result in a uniform sequency of flow with reduced turbulence. Vice-Chairman M. E. Rollman of the Cincinnati Rolling Machine Co. presided at the meeting, which was attended by 160 foundrymen.

E. C. Jeter, Ford Motor Co., Dearborn, Mich., speaking before the February 6 meeting of the Western Michigan Chapter. Listening is Chapter Chairman C. N. Jacobson, Dake Engine Co., Grand Haven.

Saginaw Valley
Kenneth H. Priestley
Vassar Electroloy Products
Chapter Reporter

SOME 200 MEMBERS and their guests attended the February 2 meeting, which began with a special drawing of interesting door prizes.

Speaker of the evening was Charles O. Burgess, technical director, Gray Iron Founders' Society, Cleveland, whose topic was *"Nodular Iron."*

Mr. Burgess presented a concise

Post-meeting foundry shop talk occupied Chapter Vice-Chairman Howard H. Wilder, Eaton Mfg. Co., Vassar, Mich., (left) and Charles O. Burgess, technical director, Gray Iron Founders' Society, Cleveland, who spoke at Saginaw Valley Chapter's February 2 meeting on uses of nodular iron.

progress report on the development and use of nodular iron, which he illustrated with slides showing the structural and physical properties of the material. Following Mr. Burgess' talk, Technical Chairman Howard H. Wilder, Eaton Mfg. Co., Vassar, Mich., lead a discussion.

Central New York

J. A. Feola
Crouse-Hinds Co.
Publicity Chairman

NINTH ANNUAL STAG PARTY was held January 14 in the ballroom of the Onondaga Hotel, Syracuse, and was attended by 190 members and guests, who enjoyed a dinner, entertainment and drawing for door prizes.

James O. Ochsner, Crouse-Hinds Co., Syracuse, was chairman of the Party Committee, assisted by Vice-Chairman J. A. Feola, Crouse-Hinds Co.; W. D. Dunn, Oberdorfer Foundries; Frank Wheeler, Kinman & Wheeler Co.; Robert Wright, United States Graphite Co.; Bruce Artz, Pangborn Corp.; Francis Troy, F. F. Shortsleeve Co.; and Jacob Kratz, Crouse-Hinds Co.

Tennessee

Carl A. Fischer, Jr.
Fischer Supply Company
Chapter Reporter

REGULAR DINNER MEETING of the chapter was held January 27, with more than 97 members and guests present to hear Dr. H. K. Salzberg, Borden Company, Chemical Division on *"Foundry Sand Practice Using Plastic Binders"*, and J. Wesley Cable, New York electrical engineer, on *"High Frequency Core Baking"*.

At the meeting the Chapter presented Dr. I. W. Grote, professor of chemistry, University of Chattanooga, with a complete library of A.F.S. publications for the research library at the University.

Dr. Salzberg illustrated his talk with slides, showing tables of results of using synthetic binders under various circumstances, as to heat and quantity of water. He explained that the synthetic binders left in hot ovens too long tend to loose strength; that the quantity of water added has a vital effect on strength. He advised these tables and literature are available to all. He explained the difference between urea and phenolic, advising that while urea at present is superior for dielectric ovens, phenolic has greater hot strength —and releases its gases more slowly.

Mr. Cable illustrated his talk with slides, showing representative installations of dielectric ovens in foundries and the various cores being cured in them. He further explained the dielectric oven cures cores in minutes; is cheaper to operate than conventional ovens, and the oven dries the water by running the cores between electrical fields at a low temperature.

Mo-Kan

Thomas F. Shadwick
Witte Engine Works
Chapter Reporter

FEBRUARY 1 MEETING, held at the Fairfax Municipal Airport Bldg., Kansas City, Mo., was well attended as a result of the Chapter Membership Committee's work in contacting every member by telephone or postcard, advising them of the meeting.

Speaker of the evening was Joseph Schumacher, Hill & Griffith Co., who addressed the group on *"Casting Defects Related to Molding Practice and Sands."* Mr. Schumacher told of three instances taken from his own experiences with various foundries:

(1) A foundry having trouble with core sand sticking in coreboxes had its problem solved by Mr. Schumacher, who found that those foundries with least sand-sticking troubles were those using cast iron coreboxes soaked in a cleaner solution overnight, then rinsed and dried. Cores in these foundries were made on coreblowing machines and coreboxes with only a few screens or slotted vents used. Scratch vents were found to give best results for solid, dense cores, and no rods or wires were used for supports. Sand mixture ran from 4 to 4½ per cent moisture. No solvents or lubricants were used to prevent sticking and some coreboxes were cleaned with water only once or twice in four or five hours. It

Talking over foundry problems at Central Indiana Chapter's February 6 meeting were, left to right: Chapter Chairman S. Franklin Swain, Golden Foundry, Inc., Columbus, Ind.; Speaker George H. Found, Magnesium Div., Dow Chemical Co., Midland, Mich.; Technical Chairman Paul L. Hargitt, Light Metals, Inc., Indianapolis; and Chapter Vice-Chairman J. W. Giddens, International Harvester Co. (Photo: International Harvester Co.)

was also found that mulling time should be from 12 to 15 min. Although not applicable to aluminum coreboxes, these experiments were tried in five foundries using cast iron coreboxes with great success.

(2) A machine tool foundry reduced scrap from 8 to 3 per cent and an automotive foundry from 12 to 2½ per cent through use of charts and simplified records. These foundries set up units of standard measurements, made tests and recorded the results on the charts. Printed lists of causes of defective castings were distributed to all personnel concerned. These instances emphasized the importance of charts and the listing of scrap with sand tests.

(3) Mr. Schumacher found from his experiences that slag losses can be eliminated by proper gating and risering. This part of the talk occasioned an open discussion in which the speaker answered many questions.

Chicago

Paul Skirha, Jr.
Crane Co.
Chapter Reporter

DEMONSTRATION COURSE SERIES, held by the Chicago Chapter at the People's Gas Light & Coke in downtown Chicago the second and fourth Mondays of each month this season, has had an excellent attendance despite inclement weather during the first three sessions. The course features actual demonstrations and discussions.

The chapter's Demonstration Course Committee, headed by George Anselman, Woodruff & Edwards, meets before each session to formulate plans and arrange for equipment. Other Committee members are: John Eckenroad, Crane Co.; Prof. Roy W. Schroeder, University of Illinois, Navy Pier Branch; Harold Haines, Howard Foundries, Inc.; W. B. Goltra, Goltra Foundries; and Paul Skirha, Crane Co.

The February 6 meeting, held at the Chicago Bar Association, had a good turnout for a showing of the A.F.S. film, *"Fluid Flow in Transparent Molds,"* with A.F.S. Technical Director S. C. Massari providing a running commentary on the film.

Ohio State University

Dallas M. Marsh
Publicity Chairman

CHILLS AND CHAPLETS were topics for discussion at the Ohio State University Student Chapter meeting February 9. Special guests were John T. Hawley, Fanner Mfg. Co. of Cleveland, and Charles T. Greenidge, Batelle Memorial Institute, Columbus.

Mr. Hawley presented two films covering in detail the manufacture and use of chills and chaplets. Next Mr. Hawley and Mr. Greenidge discussed the

Speakers' table occupants at Northeastern Ohio Chapter's January meeting, Tudor Arms Hotel, Cleveland, were, left to right: George K. Dreher, executive director, Foundry Educational Foundation; A.F.S. National Director Vincent J. Sedlon, Master Pattern Co.; and Arthur J. Tuscany, executive secretary, Foundry Equipment Manufacturers' Association. (Photograph courtesy Sterling N. Farmer, Sand Products Corp., Cleveland)

A few of the dinner guests and (background) speakers' table at the February meeting of the Northeastern Ohio Chapter at the Tudor Arms Hotel.

Interested listeners to one of the famous anecdotes of A.F.S. Past National President (1906-07) W. H. McFadden (right) at the January 20 meeting of the Texas Chapter were, left to right: John M. Bird, American Brass Foundry, Fort Worth; Texas Chapter Vice-Chairman W. H. Lyne, III, Hughes Tool Co., Houston; A.F.S. Technical Director S. C. Massari, Chicago, speaker of the evening; Chapter Chairman Charles R. McGrail, Texaloy Foundry Co., San Antonio; and Thurman Killman, Texas Steel Co.

A.F.S. Past National President Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., was the speaker at St. Louis District Chapter's January 12 meeting. Interested listeners are Norman L. Peukert (center) Carondelet Foundry Co., St. Louis, and Chapter Secretary Paul Retzlaff of Busch Sulzer Bros. Diesel Engine Co., Division of Nordberg Mfg. Company.

two products with chapter members. After each member had been given a sample box containing a variety of chaplets, the special uses for each type were explained. It was pointed out that dust, oil, rust, and moisture on chaplets can cause improper fusion and porosity mold will condense on the cold metallic surfaces. Cleanliness and freedom from moisture are also requisites in using chills.

Following a business meeting the monthly award was presented to Chapter Member David Baker for outstanding work in the interest of the chapter.

Michiana

J. P. Jordan
Dodge Manufacturing Corp.
Secretary-Treasurer

FEBRUARY 7 MEETING of the Chapter was planned to appeal particularly to pattern makers but was of interest to all foundrymen attending.

Speaker for the evening was Vaughn C. Reid of City Pattern Foundry & Machine Co., Detroit, Michigan. His subject was *"Materials Used in the Construction of Production Pattern Equipment."*

Northeastern Ohio

Robert H. Herrmann
Penton Publishing Co.
Chapter Reporter

PATTERNMAKER'S GROUP of the Chapter headlined the February 9 meeting of the Chapter, held at the Tudor Arms Hotel, Cleveland, with a talk by Albert F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, on *"Patternmaking in Foundry Work."*

Mr. Pfeiffer advocated that, when a new piece of pattern equipment is to be developed, a model of that equipment be made in addition to the drawing. The patternmaker, foundryman and engineer then should meet to discuss the model and decide upon any change before the actual pattern is made, he said.

He went on to say that records should be kept on the performance and use of all patterns. Such records form a reference file for future pattern alterations or changes in design. With regard to experimental work, be cautioned that the patterns used must not be haphazardly thrown together because the production job is going to be developed from experiments.

A practical, production-increasing idea applicable to matchplate work was suggested by Mr. Pfeiffer. When a particular job calls for the pattern to be mounted on only one side of the matchplate and the mold cavity to be only in the drag, his company often mounts patterns on both sides of the plate so that mold cavities can be made in the cope as well. A split core is used between the cope and drag, he said.

Detroit

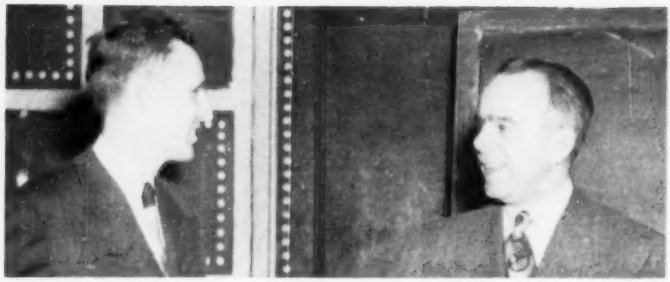
Vaughan C. Reid
City Pattern Foundry & Machine Co.
Chapter Reporter

APPROXIMATELY 200 MEMBERS and their guests attended the January 19 meeting, held at the Rackham Memorial, to hear A.F.S. National Director Norman J. Dunbeck, Eastern Clay Products, Inc., Jackson, Ohio, speak on *"Major Defects from Minor Sand Changes."*

Mr. Dunbeck stressed fundamentals frequently overlooked in the control of sand and pointed out the difference between sand testing and sand control, the former merely offering interesting statistics, the latter preventing minor changes from becoming cumulative major deviations.

The importance of determining sand properties under actual operating conditions was pointed out. As an example, the speaker said, laboratory tests under standard ramming conditions may show strengths differing widely from actual mold conditions, depending on the degree of mold ramming or

Committee members who planned the Ninth Annual Stag Party of the Central New York Chapter, held January 14 at the Onondaga Hotel, Syracuse, were, front row, left to right: Bruce Artz, Pangborn Corp.; John A. Feola and Jacob Kratz, both of Crouse-Hinds Co.; James Ogden, Cleveland Crane & Engineering Co.; and Robert Wright, United States Graphite Co. Back row, left to right: William Dunn, Oberdorfer Foundries, Inc.; Francis Troy, F. F. Shortsleeve Co.; James Ochsner, Crouse-Hinds Co.; and Jasper Wheeler, Kinman & Wheeler Co. Almost 200 foundrymen attended. (Photograph courtesy of Robert G. King, Oberdorfer Foundries, Syracuse)



H. H. Rickey (left), Ironton Fire Brick Co., Ironton, Ohio, who spoke on modern foundry refractories at Metropolitan Chapter's February 6 meeting was introduced by John Bing, Metropolitan Refractories Corp.

the consistency of mold ramming throughout the day.

Such factors as grain distribution and its significance, bonding agents and moisture control were discussed by the speaker. An extremely active question and discussion period followed Mr. Dunbeck's talk.

A coffee talk following dinner was presented by V. E. Nickel, Dearborn Motors Co., Detroit. Mr. Nickel's subject was "*Marketing*", offering many interesting side lights into the complexities of consumer research.

Missouri School of Mines

Jack Absalom
Chapter Reporter

AN INFORMAL TALK by A.F.S. Past National President Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., was a highlight of the January meeting.

Speaking principally on nodular iron, Mr. Kuniansky outlined his company's practices in this field and pointed out some of the problems involved. This portion of Mr. Kuniansky's talk was particularly interesting to members of the student chapter, since it was their first opportunity to receive first-hand information on nodular iron.

The meeting was concluded with a showing of Lynchburg Foundry Co.'s film, "*Men and Molds.*"

Central Indiana

W. K. Mitchell
L. W. and W. K. Mitchell
Chapter Reporter

SOME 80 MEMBERS attending the Chapter's February 6 meeting, held at the Athenaeum, Indianapolis, heard George H. Found, Magnesium Div., Dow Chemical Co., Midland, Mich., speak on the subject: "*Magnesium Design and Its Uses.*"

In his talk, Mr. Found outlined the uses to which magnesium castings can be adapted. He pointed out the various castings types for which magnesium is practical, as against those where some other metal would be better suited. A large portion of his address was devoted to methods of design for magnesium and other light metals, and he showed a series of excellent slides illustrating his points.

Paul L. Hargitt, Light Metals, Inc., Indianapolis, served as technical chairman. A Chapter Directors' meeting and a dinner preceded the technical portion of the meeting.

University of Minnesota

Delbert N. LeClaire
Chapter Secretary-Treasurer

ON JANUARY 24, the University of Minnesota Student Chapter held a short business meeting in the University's new Mechanical Engineering building and immediately afterwards went to the Minneapolis Electric Steel Castings Co., where the students were met by Robert C. Wood.

Mr. Wood conducted the students on an interesting and enjoyable tour of the plant, including the electric steel foundry and the control and testing laboratory. The trip proved so instructive and successful that the student chapter is making arrangements to take a similar tour of the Lake Street plant of the Minneapolis-Moline Power Implement Co. soon.

Rochester

Donald K. Webster
American Laundry Machine Co.
Chapter Reporter

FEBRUARY 14 meeting, following dinner, was devoted to a talk on "*Gray Iron as an Engineering Material,*" presented by A.F.S. National Director T. E. Eagan, Cooper Bessemer Corp., Grove City, Pa. Preceding the regular meeting, Mr. Eagan met with the Chapter's Board of Directors.

The tremendous tonnage of gray iron produced in this country annually is an indication of its place as an engineering material, the speaker said. The influence of the size, shape, and distribution of graphite particles was illustrated, together with the influence of the rate of cooling on the physical properties of gray irons. In addition to the flexibility of control possible in cupola operation, the use of alloys in recent years has extended the range of applications of cast iron to such critical parts as crank shafts, a development

(Continued on Page 91)

An informal shop talk session following the January meeting of the Birmingham District Chapter included, left to right: Chairman C. P. Caldwell, Caldwell Foundry & Machine Co.; Vice-Chairman Morris L. Hawkins, Stockham Valves & Fittings, Inc.; Dr. J. T. Mackenzie, American Cast Iron Pipe Co.; and Biddle W. Worthington, McWane Cast Iron Pipe Co.

THESE ISSUES WILL

Official Convention Information

It is only logical to expect AMERICAN FOUNDRYMAN, Official Publication of the American Foundrymen's Society, to be the principal source of Official Convention Information, which is why the foundry industry will watch the two Convention Issues for complete, authentic details.

April Pre-Convention Issue

... will contain the official convention program . . . It will be a "preview" of events to come . . . It will reach your best prospects and customers before they leave for the Congress . . . It will have distribution at this important national meeting to be held in Cleveland, May 8-12, inclusive.

May Post-Convention Issue

... will record the events of the annual convention . . . It will ... your best prospects and customers at their homes just long ... after their return to make a review of convention highlights a ... number of new products, new procedure, new developments ... It will be a timely approach to an alert market.

Be sure to take advantage

... of the opportunity to have your sales and advertising messages tie-in to the 54th Annual AFS Foundry Congress and Show through representation in AMERICAN FOUNDRYMAN, the Official Publication—now ... in advertising rates for the April-May Convention Issues.

American Foundryman

The Foundrymen's Own Magazine

222 WEST ADAMS STREET, CHICAGO 6, ILLINOIS

Workers get Clean Air and Clear Vision with ROTO-CLONE Dust Control

THEY don't "let the chips (and dust) fall where they may" in this foundry. Pictured here is a modern down-draft chipping booth which is served by an AAF Type D Roto-Clone.* Chips and dust are drawn off as fast as they are generated. Worker comfort is vastly improved and he has a clear view of the job at all times.

No matter what you grind or how you grind it, a Type D Roto-Clone will give you positive dust control. This compact, self-contained unit combines the functions of both exhauster and separator. All operations—drawing in the dust-laden air, separation of dust, delivery of collected material to storage hopper and expelling the clean air—are performed by one moving part.

You don't have to rearrange and disrupt your grinding operations to take advantage of Roto-Clone dust control. The Type D may be installed as a central type with main dust and branch connections or as an individual unit serving a single dust-producing operation. For complete information, call your local AAF representative or write direct to

AMERICAN AIR FILTER COMPANY, INC.
104 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

*Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator types.

AAF

ROTO-CLONE®
DUST CONTROL EQUIPMENT

NEW Foundry Products

Readers interested in obtaining additional information on items described in New Foundry Products should send requests to Reader Service, American Foundryman, 222 W. Adams St., Chicago 6, Ill. Refer to the item by means of the convenient code numbers.

Dust Hood

MR1—Loose fitting and weighing only 5 oz, General Scientific Equipment Co.'s G S fabric dust hoods provide ample visibility through a large clear plastic window. Fabric, supported by head frame, covers

and protects face, head and neck down to the shoulders against irritating and nuisance dusts or sprays. Hood may be worn with goggles or respirator.

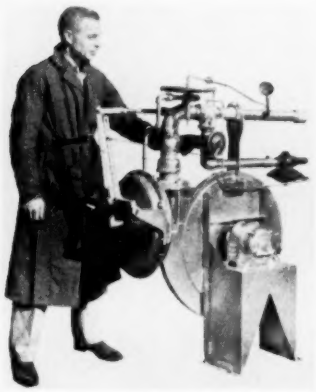
Lightweight Goggle

MR2—Comfortable lightweight protection is a feature of Willson Products, Inc.'s improved leather mask goggle. Made of high-grade, pliable leather, goggle absorbs

and distributes impact shock. One-piece elastic headband makes goggle quickly adjustable to any head size. Goggle is available in two sizes: MDL31 for hot jobs has deep, perforated eye cups to permit air circulation and prevent fogging and is corduroy bound to absorb perspiration—DL18, designed for dusty jobs, is indirectly ventilated with two baffled and screened ports on each eye cup, permitting free air circulation while excluding dust, grit and flying particles.

Gas-Air Mixer

MR3—A low cost low upkeep gas-air mixer developed by Vapofier Corp., the Consta-Mixer, maintains a constant manifold pressure to any number of burners regardless of variations in burner requirement within the capacity of the machine. Maintaining a constant mixture ratio at



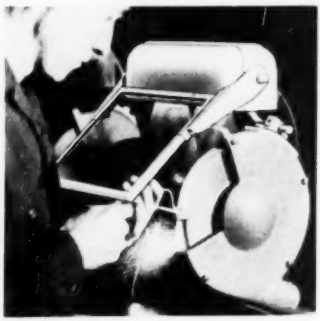
all loads, unit handles all types of gas and can be arranged for high-low operation. Consta-Mixer is available in three sizes: Nos. 2, 6 and 10, with capacities ranging from 35,000 btu to 2,000,000 btu. Unit requires minimum amount of floor space and needs no special foundation and utilizes either existing air supply or air from specially-furnished turbo-compressor.

Casting Welding Process

MR4—A new process for reclaiming defective castings and repairing cracked castings and motor blocks is announced by the Metallizing Co. of America. Process attains fusion without leaving hard spots, and applies metal to a finished casting without warping or distorting parent metal. The Dot-Weld Process, developed for salvage of defective castings with small pinholes, voids and shrinks, does not burn or oxidize metals deposited on parent metal. Other uses: repair of cracked motor blocks, heads and castings; adding metal to patterns; and preparation of hardened surfaces as a bond for sprayed metal. Unit consists of 220-volt bonder, air filter and regulator, set of rotary files and ME-1 peening hammer.

Grinder Safety Shield

MR5—Junkin Safety Appliance Co.'s Electro-Lock safety shield is both an illuminating safety shield and a machine control. As a safety shield it permits operator to see work he is doing while protecting his eyes and face from sparks, flying chips and emery dust. As a machine control, unit will not permit grinder to be started when movable shatterproof glass safety shield is not in position. Shield can be placed in any operating position and features bull's-eye lenses that focus



light on point of operation. Mercury switches control electrical circuits to lights and starting switch. Shields are available for both 110 and 220 volts.

Non-Ferrous Melting Pots

MR6—Meech Foundry, Inc.'s new series of melting pots can be furnished in almost any size and shape, with capacities ranging from 50 to more than 1,000 lb. Meechite melting pots are cast from close-grained chromium alloy iron and feature a minimum of porosity and scaling and can be used to replace crucibles in some applications. Furnished for use in melting, holding and pouring applications, pots feature gradual tapering wall thickness and side angles of slope to resist distortion.

Temperature Indicators

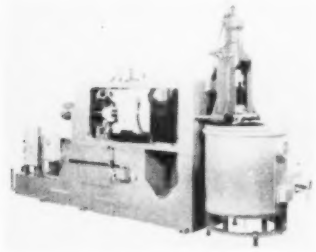
MR7—A new line of temperature indicators for industrial and laboratory use, announced by the General Electric Co., includes cold-end compensated thermocouple thermometers for temperatures up to 3000 F and resistance thermometers for temperatures to 300 F. Thermocouple thermometer is available in two sizes: Type DO-71, with 3½ in. flange, and Type DW-71, with 2½ in. flange. Both types can be supplied with either square or rounded molded textolite cases. Resistance thermometers are available in Types DB-15, long-scale; and DD-6 and DD-7 six-in. rectangular, surface and flush-mounted instruments.

Fire Extinguisher

MR8—American La France Foamite Corp. announces a complete new line of 2½ gallon silicon bronze fire extinguishers with monotype construction shells having an ultimate shell strength of 1400 psi. Other advantages of unit are lightness in weight, smart appearance, transparent plastic nozzle, projection welded hanger loop; resistance welding of collar bottom to shell, and wider bottom handle. Unit comes in foam, soda-acid and anti-freeze water types approved by Underwriters' and Factory Mutual Laboratories.

Zinc Die Casting Machine

MR9—Lester-Phoenix, Inc.'s new HP 1-Z zinc die casting machine is designed to eliminate, as far as possible, the chance for human error in setting up and adjusting the machine. Gooseneck locates itself in two machined slots and has bronze bushing to guide plunger stem, eliminating possibility of misalignment. Pot is separate from structure of machine and can be adjusted to any desired size. Plunger cylinder is rigidly mounted and requires no adjustment and oil lines are



permanent and rigid for greater safety. Unit averages 400 shots per hour, has metal pot capacity (zinc) of 500 lb. Nitrogen accumulator is included and two electric timers control die movement and metal injection cycles.

Pig Casting Machine

MR10—Newly redesigned, William M. Bailey Co.'s stationary-wheel pig casting machine for ferrous and non-ferrous smelters retains the principal features of the original Bailey machine, which eliminates 80 per cent of moving parts found in conventional pig casting machines. A chain of 15 in. cast links, connected by high manganese steel bushings and pins, replaces the customary track. Redesigned machines eliminates slow process of handling molds and breaking up scrap when casting and casts in sizes for easy handling. Cast metal can be loaded on cars directly from pig casting machine.

Platform Truck

MR11—Rapids-Standard Co.'s new line of all-steel platform trucks is available in four series and eight standard sizes. En-

tire deck is die formed on a brake from one piece of steel, then arc welded to make a smooth, rigid platform. Steel reinforced full length of deck for added strength and rigidity, trucks have inset welded handle pockets and rounded corners, leaving no projections.

Self-Dumping Hopper

MR12—Built of ½ in. plate throughout, Roura Iron Works, Inc.'s one-yard capacity self-dumping hopper is specially designed to withstand warping when handling red-hot sprues and castings. The

heavy duty hopper will fit any standard lift truck and can be instantly unloaded by lifting of release handle. Other standard Roura hoppers come in ½, ¾, 1, 1½ and 2 cu yd sizes and can also be designed for flat trucks and with special flanges to permit stacking.

Bronze Bars

MR13—National Bearing Div., American Brake Shoe Co. announces an expanded line of cored and solid bronze bars in all popular sizes, both rough and machined. A six-page bulletin, listing sizes and weights of bars, shows physical properties of "Tiger" bronze and describes its many uses and advantages, including resistance to wear, shock and friction. Complete stocks available for immediate delivery.

Gypsum Cement

MR14—Certain-Teed Products Corp.'s new gypsum cement, Densite, produces gypsum plaster casts with 10,000 to 15,000 psi compressive strengths. Requiring less mixing water than other similar products, Densite makes plaster casts five times as strong as those made with other gypsum cements, manufacturer claims. Available in either "Industrial" or "Low Expansion" grades, Densite requires no special equipment for mixing, and is designed for use in foundry patterns and metal casting investments. "Low Expansion" Densite is particularly suited to applications requiring casts having a high degree of dimensional stability. Samples available.

Drum Discharger

MR15—Cleveland Vibrator Co.'s new drum discharger is designed to speed flow of powdered or granular materials from drums. Unit consists of a standard-size steel drum head with adjustable slide gate opening, a permanently mounted pneumatic vibrator, an operating valve and

360 degree swivel connector. Unit can be attached quickly to any standard size drum to assure positive flow of materials into vats, hoppers or mixing containers. Unit can be removed from one drum and attached to another in one minute. Available accessory equipment includes pressure regulator, lubricator and filter.

Portable Electric Blower

MR16—Newest addition to Breuer Electric Mfg. Co.'s line of portable electric blowers is the Super-Powered Tornado Blower. Available powered by a 1-1/3 universal type motor, blower discharges air at a rate of 86 cfm, making it adaptable to maintenance of either large or small equipment. Water-lift is 58 in. All Tornado models may be plugged in any convenient electrical outlet and are self-lubricated.

Enclosed Instrument Panels

MR17—Compact, totally enclosed instrument panels made expressly for laboratory use are announced by the Claud S. Gordon Co. Complete with pilot light and push-button station, panels are wired and ready for connecting power and thermocouple leads to terminals in panel. Panels are suitable for bench use or for wall or floor mounting on angle brackets. Enclosed panels are available in two sizes: 19 in. wide x 15 in. high x 7 in. deep; and 21 in. high x 9 in. deep. Panels are of 16-gage steel finished in black enamel.

Foundry CORE Practice

A Revision of "MODERN CORE PRACTICE AND THEORIES"

. . . dealing exclusively with the production and use of cores in the modern foundry

Fig. 117—Bench-type Core Blowing Machine

Fig. 190—High-frequency Dielectric Core Baking Oven

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CORE MAKING METHODS AND EQUIPMENT
FACTORS AFFECTING CORE BAKING
CORE OVENS AND THEIR CONTROL
CORE FINISHING OPERATIONS
CORE COATINGS
CORE HANDLING
PROCEDURES FOR DETERMINING THE PROPERTIES OF CORES AND CORE MIXTURES
CONTROLLING CORE PROPERTIES
CORE SETTING
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FOUNDRY Literature

Readers interested in obtaining additional information on items described in Foundry Literature should send requests to Reader Service, American Foundryman, 222 W. Adams St., Chicago 6, Ill. Refer to the items by means of the convenient code numbers.

Steel Casting Charts

MR101—Two newly-revised steel casting reference charts covering 33 selected grades of carbon and low alloy, stainless, corrosion- and heat-resistant alloys have been compiled by Lebanon Steel Foundry. Incorporated in the charts is detailed reference material on specification designations, analyses, physical properties, heat treatments and related data on 18 high alloys and 15 low alloys and carbon steels developed to fill a wide range of exacting engineering and design requirements for varied industrial applications. Charts also list comparable ACI, AISI, ASTM, SAE, Hydraulic Institute and U. S. Navy steels.

Abrasive Belts

MR102—Available on request is Minnesota Mining & Mfg. Co.'s 36-page booklet on use of abrasive belts in industry. The booklet contains case history examples and technical data on grinding and polishing. Abrasive belt techniques are described and pictured for such materials as gray iron, manganese, bronze and aluminum castings, wood, ceramics and plastics. Also covered is the new pre-finishing technique in which the usual process of steel-forming and then polishing is reversed to achieve maximum production line speed. Also listed are details on belt equipment, belts and contact wheels.

Dust Suppressors

MR103—Two new bulletins on Wet-Type Hydro-Clone dust and fume suppressors are announced by the Whiting Corp. The first of these four-page bulletins describes the horizontal type Hydro-Clone and the other the vertical type. Both bulletins contain cutaway illustrations explaining Hydro-Clone operation. Dimension tables for various units and installation photos are included.

Tool Steel Analysis

MR104—A direct reading method of analysis for stainless and tool steels, described in a technical bulletin available from Applied Research Laboratories, is claimed to be equivalent in accuracy to routine chemical methods. Total time of analysis for all metallic elements is two to three minutes, including sample preparation. Precision attained for chromium and nickel is reported to be much higher than that for any spectrochemical system. Equipment utilized consists of a two-meter spectrometer, recording console and a Multisource unit.

Belt Conveyors

MR105—Complete information on stationary, portable and 16 types of special purpose belt conveyors, both troughed and flat belt, is contained in Lippmann Engineering Works' 32-page booklet on belt conveyors. Included are future applications and methods of selection of belt conveyors; dimensions, weights and specifications for standard head, tail and intermediate sections; lattice, channel and timber frames; and terminal machinery.

Screw Thread Standards

MR106—Supplement to Handbook H28 (1944), *Screw Thread Standards for Federal Services*, has just been issued by the National Bureau of Standards. This publication makes effective a number of changes in American screw thread standards which have been adopted by the Government's Interdepartmental Screw Thread Committee. Revisions and additions approved by time of going to press are given in appendix. Supplement comprise 57 pages, 28 tables, 11 figures and is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. at 25 cents per copy.

Briquetted Ferro-Alloys

MR107—Improvement of cast iron quality through addition of silicon, manganese and chromium ferro-alloys is discussed in a 24-page illustrated booklet recently published by Electro Metallurgical Div., Union Carbide & Carbon Corp. Booklet describes in detail how briquetted ferro-alloys can be used to control the composition of iron and compensate for variations in raw materials, and also discusses methods for controlling amounts of carbon, sulphur and phosphorous in iron. Tables of typical cupola charges show how to calculate the number of briquets required to produce either soft gray iron, medium soft iron, high strength iron or low chromium iron. There is also a discussion of the advantages of using briquets in duplexing melting of malleable.

Fireclay Brick

MR108—Laclede Christy Co. of Pennsylvania's new illustrated six-page folder describes Laclede Keystone dry press firebrick, its properties and applications. A chart shows applications of other Laclede Christy refractory products, together with their softening points, air or heat sets, weight per 1000 bricks, weight by cu ft, acidity or neutrality and uses.

Grating Spectrographs

MR109—Grating spectrographs in both one-meter and three-meter styles are described in Baird Associates, Inc.'s new 12-page bulletin. Descriptions are supplemented by diagrams illustrating modified mounting and by photographs showing external and internal construction. Bulletin also includes chart showing relative sensitivity of spectrochemical tests for elements and a bibliography.

Air Compressors

MR110—Joy Mfg. Co. announces a new bulletin on its line of WL-80 Unitair compressors. Bulletin includes a selector chart plus detailed section drawings and parts photographs illustrating economy and operating features. Unitair compressors are available in 11 sizes, 15 to 125 hp, with piston displacements from 81 to 610 cfm at 125 maximum pressure. These two-stage air-cooled compressors are furnished as complete motor-driven units with three standard electric drives, including built-in motor, direct and V-belt drive.

Bonding Mortar

MR111—Described in a four-page folder is Quigley Co., Inc.'s Q-Chrome, a flame and slag resistant chrome air-setting bonded mortar for hot patching and lining of furnaces. Features described in booklet are (1) bonds through wall, (2) finely ground, (3) stays in suspension, (4) heat, flame and slag resistant, and (5) reduces spalling.

American Economic System

MR112—DoALL Co., as a public service, has prepared a booklet listing all films, posters, literature, charts, etc. available on the American Economic System and has prepared large display boards showing actual samples of these educational aids and their sources for use at meetings of business and civic organizations. National economic and civic organizations are cooperating with the DoALL Co. in its program of making these aids available.

FOUNDRY FIRM Facts

American Israel Foundries Corp., an organization which plans to construct and operate a non-ferrous foundry in Israel, was recently incorporated under laws of the state of New York. The new organization will first concentrate on production of non-ferrous castings to meet needs for Israel's housing program. Directors named in the certificate of incorporation are: Paul Herzog, Sidney Danziger, Bernard Fabrikant, Franz Lissauer and Abraham M. Lowenthal, all of New York; Herman Moskowitz, Jersey City, N. J.; Hugo Simon, Newark, N. J.; I. Hettlesman, Baltimore; Sam Suisman, Hartford, Conn.; Samuel Greenfield, Buffalo; and Archie Rosenthal, Philadelphia. A statement is being filed with the SEC to permit a public offering of the stock. Plans for constructing, equipping and operating the foundry will be announced shortly.

Carborundum Co., Niagara Falls, N. Y., announces completion of a $2 million plant at Vancouver, Wash. The new plant will augment the silicon carbide output of similar Carborundum Co. plants in Niagara Falls; Quebec, Ont.; and Norway and will serve the abrasive and refractory needs of western United States industries. Management personnel for the Vancouver plant are J. L. Bergman, superintendent; A. C. Knapp, engineer; and E. E. Einhorn, office manager.

E. H. Sargent & Co., manufacturer and distributor of laboratory equipment, recently completed a new and modern building at 4617 W. Foster Ave. to house the company's Chicago offices and plant. Included in the new building are facilities for warehousing, engineering staff, an instrument factory and laboratories.

Whiting Corp., Harvey, Ill. and Los Angeles, Calif., has opened a district sales office serving the Southwest in the M & M Bldg., Houston, Texas. Elmore C. Brown, formerly sales engineer with the company's Chicago office, has been named Houston district manager. The new office will handle sales of foundry equipment, cranes and railroad equipment, and the Swenson line of evaporators, driers and chemical plant equipment.

United Engineering & Foundry Co., Pittsburgh, recently acquired **Stedman's Foundry & Machine Works, Inc.,** Aurora, Ind., and **Lobdell United Co.,** Wilmington, Del. Employing approximately 200 persons, the Stedman plant has operated two divisions since 1912—a foundry division specializing in gray iron castings of a wide range of mechanical properties—and a machinery division manufacturing crushing, grinding and screening machinery. In business since 1836, the Lobdell Co. sold its properties to United last November, including machine shops, pattern shops, boiler house, powerhouse and office building. The Lobdell Co. will continue to manufacture papermill machinery, mill roll grinders and forging hammers.

Link-Belt Co., Chicago, has opened a factory branch store and warehouse at 2630 Holmes St., Kansas City, Mo. The two-story structure will warehouse and sell conveying and power transmission machinery parts, chains, sprockets, speed reducers, elevator buckets, etc.

Ironton Fire Brick Co., Ironton, Ohio, has appointed Robbins and Bohr, 535 Chattanooga Bank Bldg., Chattanooga 2, Tenn., as its Tennessee representative.

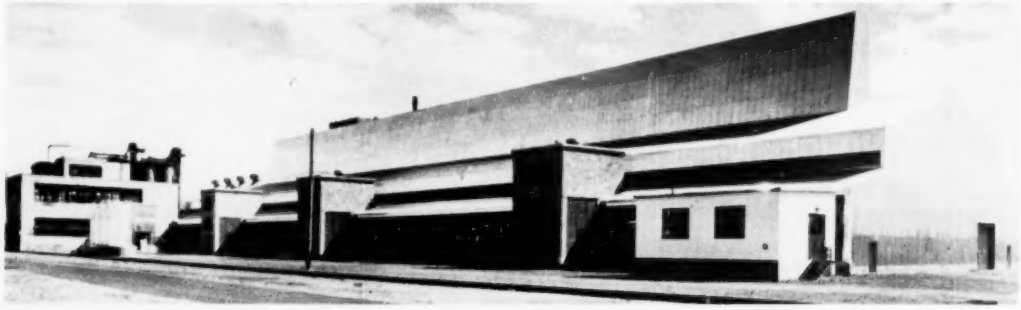
Refractory Specialty Sales Co. announces the removal of its plant and general offices to 2200 Washington Ave., Philadelphia 46, Pa.

Interlake Chemical Co. recently sold its liquid phenolic resin manufacturing plant at Forest Park, Ill., to the Acme Resin Corp. President of the newly-formed Acme Resin Corp. is Myron T. Bennett, formerly vice-president in charge of sales for Interlake Chemical; vice-president is Edgar Bourke; and secretary, S. A. Mitchell. The new company is retaining key plant operating and sales personnel from the Interlake Corp. and will continue to produce resins under Interlake Chemical Corp. formulae and controls.

Mine Safety Appliances Co., Pittsburgh, has opened a new warehouse at 5-15 Forty-ninth Ave., Long Island City, N. Y., to serve the company's eastern New York and Connecticut territories.

Federated Metals Division, American Smelting & Refining, will be host at its Whiting, Ind., plant to a group of students from the metallurgical department of the University of Minnesota. The inspection tour, made annually by senior students, will be conducted by Plant Superintendent J. F. MacQuillan. Instructor G. Bitsianes of the Minnesota department of metallurgy will be in charge of the students. Particular attention will be given to smelting and refining of solders and type metals, die casting alloys, bearing metals and copper-base casting alloys.

Whiting Corp., Harvey, Ill., announces the removal of its Philadelphia district sales office to No. 9 Rittenhouse Place, Ardmore, Pa. Telephone is Ardmore 8100.



Designed to permit continuous material flow, Carborundum Co.'s new $2 million silicon carbide plant will serve western United States abrasive and refractory plants. Located in Vancouver, Wash., the new plant has such facilities as full-automatic mix building, welded steel furnace plant with batteries of resistor furnaces, quality control laboratory, machine shop, electrical welding and blacksmith shop, storeroom, boiler and pump room, garage. Located on a 99-acre site, the Vancouver plant is in close proximity to raw materials sources and has a plentiful supply of power from the Bonneville Dam.

PERSONALITIES

(Continued from Page 69)

meetings of the Society and has published several articles in the technical press. Mr. Caine's business address is 322 Poplar Ave., Wyoming 15, Ohio.

Daniel Connell has succeeded **Rolph Jenkins** as editor of Campbell, Wyant & Cannon Foundry Co.'s internal house organ, "*Casting the News.*" Mr. Jenkins who served last year as reporter for the A.F.S. Western Michigan Chapter, is now editor of the "*Kellogg News*" for the Kellogg Co., Battle Creek, Mich. Mr. Connell is also employment manager of Campbell, Wyant & Cannon's Sanford Street plant, Muskegon, in addition to his new duties as company house organ editor.

Donald L. Clark of Lockport, N. Y., has been appointed vice president of the Electric Metal Makers Guild; Inc., succeeding **E. R. Chelius**, who has resigned.

H. Walter Regensburger has been appointed chief engineer of the Link-Belt Co.'s General Engineering Dept., succeeding **Harry L. Strube**, who retired recently. Assisting Mr. Regensburger will be **Charles M. Younger, Jr.**, chief developmental engineer and **Harold F. Watson**, chief standards engineer. Mr. Regensburger, who joined Link-Belt in 1926, was formerly assistant chief engineer, General Engineering Dept.

C. W. Hockman has been named superintendent in charge of Cadillac Foundry Operations, Cadillac Motor Car Div., General Motors Corp., Detroit. Mr. Hockman, who was formerly executive assistant superintendent of Foundry Operations, succeeds **J. E. Bunch**, who is now on special assignment with the Manufacturing Division.

I. W. Mohr recently succeeded the late Clarence J. Dausch, Jr., as foreman of the National Cash Register Co.'s Foundry Dept., Dayton, Ohio. Mr. Mohr, who began with National Cash Register as a foundry apprentice in 1936, was formerly job foreman in the foundry.

R. A. Roosevelt replaces **George R. Wellmon**, who recently resigned, as sales manager for the Erie Mfg. Co., Erie, Pa. Mr. Roosevelt, who has been Erie's advertising manager for three years, will direct the company sales and advertising campaigns in his new capacity.

Leon A. Blum has been named sales manager and **Donald A. Beilstein** assistant plant superintendent of the San Francisco plant, Federated Metals Div., American Smelting & Refining Co. Mr. Blum replaces **F. A. Wahlheim**, who retired.

Norton Co., Worcester, Mass., announces the transfer of the following four members of its outside sales department: **William C. Howard**, formerly field engineer in the Hartford, Conn., area, to be abrasive engineer at New Haven, Conn.; **John W. McCue** and **F. Donald Wing**, to be field

engineers with the Chicago office; and **John W. Wheeler**, to be sales engineer in the Connecticut area.

Donald S. Leonard has been appointed sales representative for the United States Graphite Co., Saginaw, Mich., and will make his headquarters in Pittsburgh. In addition to handling sales in the Pittsburgh territory, Mr. Leonard will represent the company in northwestern Pennsylvania, part of Maryland, Virginia and West Virginia. Mr. Leonard has been with U. S. Graphite since receiving his B.S. degree in chemical engineering from the Michigan College of Mining and Technology in 1949.

Ernest M. Knapp, since 1946 assistant treasurer of Ferro Machine & Foundry, Inc., Cleveland, has been elected treasurer

E. M. Knapp

and assistant secretary of the company, succeeding **N. E. Gauthier**, who retired recently. Mr. Knapp has served for several years as a director of the Cleveland Chapter of the National Association of Cost Accountants and is treasurer of the Greater Cleveland Chapter of Junior Achievement.

Horance R. McCoy has been named metallurgist for the Texas Electric Steel Casting Co. Formerly chief metallurgist for the Ohio Steel Foundry Co., Lima, Ohio, where he specialized in the casting of armor to rigid metallurgical specifications, Mr. McCoy has held executive metallurgical positions in several large Eastern and Midwestern foundries. A graduate in chemical engineering from Western Reserve University, Mr. McCoy has also taken post-graduate work in metallography and heat treating of iron and steel at the Case School of Applied Science.

Malcolm W. Valentine has been named superintendent of inspection and quality control for Hunt-Spiller Mfg. Corp., Boston. Mr. Valentine started with Hunt-Spiller as a patternmaker in 1915.

Harnett P. Munger has been appointed by Battelle Memorial Institute, Columbus, Ohio, to coordinate its air pollution research activities and to act in a liaison capacity between Battelle and industry. Dr. Munger has had 20 years of varied

industrial and professional experience in chemistry and chemical engineering. Research under his supervision will include studies of (1) the mechanism of air contamination and methods for its reduction, (2) the utilization of industrial wastes that might pollute the air, (3) the effects of air pollution on plant life and building materials, (4) the effects of weather and plant site upon the concentration of wastes, and (5) other technical and economic studies designed to help industry solve the problems that arise with its efforts to control air contamination.

Robert J. Anderson, light metals consulting engineer, announces the removal of his offices from Pacoima, Calif., to 3932 Illinois Ave., N. W., Washington 11, D. C. Mr. Anderson was awarded the A.F.S. McFadden Gold Medal in 1925 for his scientific contributions to the aluminum founding industry.

E. Emil Svoboda recently became foundry superintendent for Marion Casting Co., Marion, Ohio. He was formerly foundry foreman of Busch-Sulzer Bros. Diesel Engine Co. Div. of Nordberg Mfg. Co., St. Louis.

Fred H. Haggerson, president of the Union Carbide & Carbon Corp., New York, was recently awarded the American Society for Metals' 1949 Medal for the Advancement of Research for furthering the progress of American business through industrial research.

Frank Sherman, president of Dominion Foundries & Steel, Ltd., Hamilton, Ont., Canada, has been named to the Board of Directors of Polymer Corp.

R. G. Fredette, formerly with the Raytheon Mfg. Corp., has been named production manager for the Hunt-Spiller Mfg. Corp., Boston, it is announced by General Manager A. J. Edgar.

Walter E. Oelschlaeger has succeeded the late Lewis D. McClaren as manager of the By-Product Coke Dept. of the Republic Coal & Coke Co., Chicago. Mr. Oelschlaeger, who began his career with another by-product coke firm, Rogers, Brown & Co., Cincinnati, was assistant to Mr. McClaren for 16 years.

OBITUARIES

Leonard B. Bull, managing director, Dartmouth Auto Castings, Ltd., Smethwick, Staffordshire, England, died December 24. Mr. Bull had been with the Birmid Industries group of companies for 13 years, the last eight years with Dartmouth Auto Castings.

Charles Schneider, 68, for the last 12 years superintendent for the Brisk Foundry & Machine Co., Imlay City, Mich., died at his home in Imlay City January 7. A veteran of 51 years' service in the foundry industry, Mr. Schneider received a 50-year pin at last year's A.F.S. Convention in St. Louis. He was with Bunting Brass & Bronze Co., Toledo, Ohio, and the Bohn Aluminum Co., Detroit, for many years.

Clarence J. Dausch, Jr., 33, foreman of the Foundry Department of the National Cash Register Co., Dayton, Ohio, died early last month. Mr. Dausch had been with the company since 1935.

J. Ralph Turner, 47, president of the Queen City Sand & Supply Co., Buffalo, N. Y., died February 5 at his home in Tonawanda, N. Y. Mr. Turner organized the Queen City Sand & Supply Co. in 1923 after moving to Buffalo from Tonawanda, Ont. Mr. Turner was a past secretary of the Western New York Chapter.

Albert F. Paustian, 83, chairman of the Board of Directors of Brillion Iron Works, Inc., Brillion, Wis., died at his home in that city January 1. Mr. Paustian had been with Brillion Iron Works since 1933.

Stephen C. Cheney, 67, president of S. Cheney & Sons foundry, Manlius, N. Y., died at his home in Manlius January 5. Mr. Cheney had been an officer of the Syracuse Foundrymen's Association, predecessor of the Central New York Chapter of the American Foundrymen's Society.

ABSTRACTS

Abstracts below have been prepared by Research Information Service of The John Crerar Library from current American and foreign literature. For literature searches and translations of technical, industrial, and scientific literature, and photostats and microfilm, write to: Research Information Service, The John Crerar Library, 86 East Randolph Street, Chicago 1, Illinois.

Dust Control for Profit

17—Reclamation. Harry V. Welch, "The Fume and Dust Problem in Industry," *Journal of Metals*, vol. 1, Dec. 1949, pp. 934-947.

Some of the dust and/or fume producing plants and operations are discussed along with how reclamation of these in certain plants makes the difference in showing a profit or loss in operations. The industries covered are: iron and steel works, power plants, copper smelters, lead and zinc smelters, and cement plants. The differentiation between dust, fumes, agglomerates, etc. is briefly described. Other main points discussed are: dust and fumes in community and individual living, means or procedures for dust and fume collection, and a description of the various types of equipment used. The equipment described includes: settling chambers, inertial or cyclonic equipment, spray chambers and/or scrubbers, filters, and electrical precipitators.

Steel Founding Developments

18—Technical Advances. S. L. Getsman, "Steel Foundry Practice in Canada," *Canadian Metals & Metallurgical Industries*, vol. 12, Dec. 1949, pp. 12-15, 32, 34.

Technical developments which have occurred in the Canadian steel foundries in recent years include foundry mechanization, quality control, and the use of applied research. A few of the research projects undertaken are: study of metal penetration, bleeding tests, effects of sand, effects of silica flour, effects of iron oxide additions, and others.

Magnesium Castings Properties

19—Latest Design Data. George H. Found, "Efficient Magnesium Castings—Their Design and Production," *Metal Progress*, vol. 56, Dec. 1949, pp. 833-840.

Latest data are presented regarding the creep, endurance, and notch sensitivity of magnesium casting alloys, ASTM classification AZ63 and AZ92. The comparison of plate bending fatigue tests run in the laboratory with field tests show a close correlation in results. Therefore, the results obtained from the former can be used for indicating safe stress ranges for castings in service. The endurance of magnesium castings is improved by ball peening and by transverse machining plus transverse rubbing. The diameter of the balls used is 3/16 in. Surface rubbing consists of moving a ball-ended tool across the lubricated surface of the metal at a pressure causing surface deformation.

Melting and Casting Beryllium

20—Special Techniques Needed. J. G. Kura, J. H. Jackson, M. C. Udy, and L. W. Eastwood, "Preparation and Casting of Beryllium Melts," *Journal of Metals*, vol. 1, Oct. 1949, pp. 769-778.

The authors discuss the physical and chemical characteristics of beryllium along with the special techniques which are involved in melting and casting the metal. Beryllium static castings and centrifugal castings are described. In static casting, best results are obtained by pouring di-method. Induction furnaces with graphite-rectly from the furnace using the Durville bonded silicon carbide crucibles have proven most successful in melting.

Ideal Aluminum Foundry

21—Equipment and Advantages. W. A. Turner, "An 'Ideal' Foundry—Plant, Equipment, and Process Machinery," *Metal Industry*, vol. 75, Oct. 14, 1949, pp. 337-342.

The author discusses an ideal foundry for aluminum starting with a description of the site and buildings. This is followed by discussions of the sand plant, molding department, core shop, melting department, cleaning and finishing room, heat treat department, and inspection.

CHAPTER ACTIVITIES

(Continued from Page 77)

in which Mr. Eagan has had a long and valuable experience.

The speaker stressed the importance of closest cooperation between designer and foundryman to aid in the production of sound serviceable castings. As a result of careful studies of stresses and strains, and a knowledge of physical properties, cast iron has come to occupy a position in engineering that would have been impossible otherwise, he said.

Recent developments in nodular iron production have opened up a still broader field, and it is certain that this new material will find a place in industry, not as a miracle metal, but as a sound engineering material with valuable properties, the speaker said.

Birmingham District

J. P. McClendon
Stockham Valves & Fittings, Inc.
Publicity Chairman

JANUARY MEETING featured a talk by J. A. Wickett, Plastics Div., Monsanto Chemical Co., Chicago, on *"Application of Synthetic Resin Core Binders in the Core Room."*

This proved to be one of the most interesting talks the Chapter has had on preparation of sand for core making. Resin binders have been tested and proven and will overcome some of the obstacles found in other more commonly known mixes used in the core room, according to the speaker. The talk was instructive and the round table discussion following was well participated in and brought out many fine points. Over 100 foundrymen and friends were present at this meeting.

C. P. Caldwell, Caldwell Foundry & Machine Co., chairman, presided at the meeting and Fred K. Brown, Adams, Rowe & Norman, Inc., secretary treasurer, read the minutes and gave the treasurer's report. Mr. Caldwell announced the social hour and dinner preceding the technical sessions would continue at future meetings and urged everyone to attend and enjoy the fine fellowship found there.

Northeastern Ohio

Robert H. Herrmann
Penton Publishing Co.
Chapter Reporter

TWO FILMS were shown at the January 12 meeting, held at the Tudor Arms Hotel, Cleveland. In place of the usual coffee speaker, a black and white sound film produced by Fanner Mfg. Co., Cleveland, was shown. The film has an interesting and well-presented commentary on the purposes and applications of chaplets in the manufacture of castings. It pictures foundry operations in the automotive, radiator and boiler industries.

The A.F.S. Aluminum and Magnesium Division film, *"Fluid Flow in Transparent Molds,"* was shown at the technical session. Walter E. Sicha, Aluminum Co. of America, gave the commentary on the picture. The film shows flow phenomena of water, containing aluminum powder, in transparent plastic molds. It is a progress report on a study started in 1946.

In brief, the study showed that a pouring box should be employed in pouring molds, and the liquid level in the box should be kept sufficiently high to avoid formation of a vortex in the sprue. The opening from the box to the sprue should be rounded. The sprue should be tapered with the largest cross-sectional area at the top, and the base of the sprue should be rounded, the film showed.

A wedge should be employed in the runner at the base of the sprue to divide the liquid stream into the runners. Cross-sectional area of the runners should increase gradually away from the sprue. Square corners and abrupt changes in direction should be avoided in the entire system of gates and runners, the film concluded.

Western New York

Roger E. Walsh
Hickman, Williams & Co., Inc.
Chapter Secretary

SPEAKER at the February 3 meeting, held at the Sheraton Hotel, Buffalo, and attended by 75 members, was George A. Mau, Johnson-March Corp., Philadelphia, who spoke on *"Foundry Dust Control by Liquid Diffusion."*

Mr. Mau spoke on the different types of wetting or surface action agents as a supplement to mechanical dust collectors and explained the operation of proportioning equipment.

There is no standard wetting agent for dust control because of the many types of dust, the speaker said, and no one detergent can handle all types of dust because of differences in density, size and components. Some dusts, he added, absorb a gas film which raises surface tension and cannot be dispersed by low tension wetters.

In describing various types of dust, the speaker cited figures on the length of time each requires to settle. There are at present five kinds of surface acting materials, Mr. Mau said: wetting agents, penetrating agents, disbursing agents, emulsifying agents and foaming agents.

For successful results, the speaker concluded, wetting agents must have proper nozzles, depending upon the size of particles to be sprayed, and they are classified under such headings as

fog, 5 to 50 microns; mist, 50-100 microns; drizzle, 100 to 400 microns; and drop, 400 to 4000 microns.

A panel of four foundrymen told of their experiences with wetting agents preceding Mr. Mau's talk.

Twin City

Lillian K. Polzin
Chapter Secretary-Treasurer

FEBRUARY MEETING, held in Minneapolis, featured a talk by J. David Johnson, Werner G. Smith Co., on *"Core Room Practice,"* presented before some 50 foundrymen.

The speaker explained the various research projects which his laboratory was undertaking and stressed the importance of careful analysis of all of the ingredients which enter into the formulation of an acceptable core sand mixture. Specifically, Mr. Johnson described the effect of the base sands, moisture, mixing time, and binder proportions on core sand mixtures.

He pointed out the value in using a moistureless sand and also the part that each ingredient plays in binding the sand grains together. Density was discussed by the speaker as well as those variables which cause a core to resist metal penetration.

An extremely interesting discussion followed the lecture. Questions were asked regarding various types of mixers, weight versus volume measurements, the water demand of pure sand, and method of mixing core sands.

Central New York

John A. Feola
Crouse-Hinds Co.
Publicity Chairman

FEBRUARY MEETING, held on the roof garden of the Onondaga Hotel, Syracuse, February 10, was attended by 80 members and guests, who viewed the A.F.S. film, *"Fluid Flow in Transparent Molds,"* narrated by A.F.S. Technical Director S. C. Massari.

Before showing the film, Mr. Massari outlined briefly the work being done by the various A.F.S. research committees and also described the manner in which these research projects are set up.

The film is part of the progress report of the first year's work on the Aluminum and Magnesium Division Research Project conducted at Battelle Memorial Institute, and portrays the behavior of fluids when they enter molds having different types of pouring dishes, sprues and runners. It utilizes transparent molds and high speed photography.

During the showing of the film, the speaker pointed out sources of gas inclusion in the pouring system and also steps that had been taken to overcome it. As the pouring and gating system was improved, it was easily seen that the fluid entered the mold cavity with less turbulence and a minimum of gas absorption.

Mr. Massari explained that since the film has been completed, much more work has been done on the project. This will be reported at the convention in Cleveland in May and also will be available in preprints early this spring.

Eastern New York

George E. Danner
American Locomotive Co.
Publicity Chairman

MEETING JANUARY 17 at Lathams, N. Y., the Chapter heard Prof. James S. Campbell, Jr., of Rensselaer Polytechnic Institute, Troy, N. Y., speak on *"Education for the Foundry Industry."* Mr. Campbell is a member of the Eastern New York Chapter.

The speaker cited what is being done at Rensselaer to interest students in the foundry industry and described the school's engineering program in detail. The speaker concluded by showing a motion picture that is used in student training. An open discussion followed, in which many foundries offered their assistance to R.P.I.'s program.

Central Michigan

F. P. Tobakos
Albion Malleable Iron Co.
Publicity Chairman

SIXTY MEMBERS and guests met at the Central Michigan Chapter's first dinner meeting of the new year, held on January 18 at the American Legion Clubhouse in Battle Creek. Guest speaker for the evening was Bernard P. Mulcahy, Fuel Research Laboratory, Inc. Indianapolis, who spoke on *"Cupola Operations and Foundry Coke"*.

Mr. Mulcahy began his talk by discussing the three types of coke produced: blast furnace coke, foundry coke, and coke for general heating. Of these, foundry coke is the hardest to produce and cannot be produced by every coke manufacturer, he said.

With reference to the cupola, Mr. Mulcahy stated the cupola is very simple in design and yet has a very high thermal efficiency. The principal dimensions of the cupola are its diameter which determines the output capacity and its height which affects its thermal efficiency, he said.

According to the speaker, the raw materials used and the method of charging also have a great effect on the operation of the cupola. Scrap should be as uniform as possible and should not vary from one carload to another.

If the carbon in scrap were to vary from 0.4 per cent to 0.7 per cent it would affect the carbon solubility. Uniformity should also apply to the coke since the coke is used to supply heat

and determines carbon absorption and preservation which should always be the same. The most important characteristic of coke is its size, he said.

The size of coke determines the rate of combustion and also the rate at which it will discharge gases through the cupola. Uniformly sized coke is ideal said Mr. Mulcahy, who recommended that clamshell buckets should not be used to handle coke if possible because of breakage.

Mr. Mulcahy further stated the air is the only raw material over which complete control can be exercised. He recommended the hot blast, if economically feasible, over the cold blast. The dry blast should also be used since wet air affects the operation of the cupola.

Mr. Mulcahy concluded his talk by showing slides illustrating the many points he had brought forth. The discussion period proved to be of interest to all with a good number of those present taking part. Don Gilchrist, Homer Furnace Co. acted as technical chairman of the meeting.

Chapter Chairman Fitz Coghlin, Jr., announced the appointment of Don Gilchrist of the Homer Furnace Company to replace Jack Durr, who has transferred to the Northwestern Pennsylvania Chapter, as a Chapter Director for the remainder of the year. Mr. Coghlin also announced the start of the 1950 Educational Program, which featured as its first project an Albion Malleable Iron Co. plant visitation.

Northwestern Pennsylvania

Earl M. Strick
Erie Malleable Iron Co.
Chapter Secretary

Two meetings were held by the Chapter in January. The first was held at the Penn Grove Hotel, Grove City, Pa., January 9, with Douglas James, Cooper-Bessemer Corp., Grove City, in charge of the meeting, which was attended by foundrymen from Erie, Meadville and Grove City, Pa., and Detroit, Mich.

William McCracken, Cooper-Bessemer Corp., introduced the speaker, William H. Moore, Meehanite Metal Corp., Cleveland. Discussing the practical side of *"Synthetic and Natural Bonded Molding Sands,"* Mr. McCracken concluded his talk by leading discussion on buckles and scabs.

The regular monthly meeting of the Chapter was held January 9 at the Moose Club, Erie, and featured a showing of the A.F.S. Aluminum & Magnesium Division film, *"Fluid Flow in Transparent Molds,"* with Walter Bonsack, of Cleveland, as the film's narrator. The discussion period following showing of the film was lead by Jacob Diemert of the Erie Castings Co., Erie, Pa.

Index to Advertisers

A.F.S. Publications

A. F. S. Employment Service

To contact "Help Wanted" or "Position Wanted" advertisers, write to American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, designating item number and issue of AMERICAN FOUNDRYMAN in which advertisement is published.

HELP WANTED

HW520—Aluminum Foundryman: Reliable 50 year old firm located in Middle West interested in contacting foundryman experienced in all phases heat treated cast aluminum production. Prospective contract will require man capable of handling relatively small operation. Please give qualifications, references, salary expected and other pertinent data.

HW521—Sales Engineer: Prominent midwest manufacturer of conveyors and related equipment requires services of a man thoroughly experienced in high production foundry processes, equipment, and layout. Prefer graduate engineer, age 35 to 45, with demonstrated sales ability. This permanent position offers excellent compensation and opportunities for future growth. All replies confidential.

HW522—Iron Foundryman Opportunity: To strengthen top management due to contemplated retirements, there is an excellent job opportunity for a young "mature" tip-top experienced, practical foundryman in a nationally known, well established, progressive jobbing and semi production foundry in Ohio. Plant currently employs 225 persons (war peak 600) producing exceptionally high quality light and medium iron castings in a wide variety of specification items. Castings weigh from less than an ounce each to generally not over 500 lb each and sections vary from a scant ⅛ in. to 4 to 6 in. Deliveries are not limited to a local community market, but a variety of different industries are served throughout Ohio and the eastern states.

Applicant must have no concern for job title. The proper person can help carve his own permanent future, if he can successfully handle all foundry operations and departments. Company realizes some months will be required for proper person to become acquainted with present personnel, various types and nature of production, and unusually high quality casting standards.

Applicant must have good previous experience and employment record. Must be able to handle men. Must be of a caliber to work harmoniously with present supervisory force, which he is to supplement, and to observe and learn from present qualified, experienced, and practical top personnel now carrying on very well. He must be able to instruct and train engineering graduates who are being built into a larger supervisory and executive organization to prepare for greater production.

Give detailed resume of personal history, education, training, past, and present connections, earnings, and photograph (all of which will be kept confidential) in first letter, for from it a decision will be made as to whether applicant will be invited for a personal interview to the company's plant at company expense.

HW523—Maintenance Supervisor: Preferably with engineering degree, for 100 molder gray iron foundry. Preventive maintenance program important. Should have experience in maintenance and repair work in all departments. Give personal resume covering fully: education, past and present responsibilities, earnings, and photograph. All information held confidential.

HW524—Core Department Supervisor: Must be fully qualified to handle entire department employing 25 to 75 men making, preparing, and assembling cores for gray iron foundry. Must know mixes and finishes for all types of cores from machine tools to light diesel engine cylinders and heads. Must know how to make cores on bench, machine, and blower, and be able to prepare and assemble intricate cores. Must operate core department generally for convenience of foundry departments. Job requirements are high. Practical knowledge and ability to work with people essential.

Application must include full details of training, previous and present employers, earnings, and photograph. Information strictly confidential.

HW525—Salesman: Want young man with pattern shop or core room experience to travel extensively on demonstration and sales of new core room specialty. Technical training and attractive personality desirable.

POSITIONS WANTED

PW125—Iron/Steel Foundry Manager: 17 years experience in foundry and metallurgical development work. Excellent experience history. Top flight iron and steel foundry background, thoroughly capable of assuming executive responsibility. M. S. in metallurgy; have written technical papers. U.S. citizen. Salary $15,000 plus efficiency bonus.

PW126—Troubleshooter or Supervisor: Gray iron foundryman for 44 years, plus 5 years brass work, with broad experience molding light and heavy castings. Have background in applied mechanics, foundry chemistry, cupola practice. Seek job as troubleshooter.

PW130—Metallurgist Ceramist: Desires development position with administrative responsibilities. Have 12 years experience, chiefly development, in non ferrous metallurgy and high temperature ceramics. Some teaching and production; proven ability putting original ideas into practice. Capable of setting up ceramic-metallurgical laboratory together with experimental foundry. Married, age 32. B. Chem. E. 1940.

PW131—Chief Metallurgist: Fourteen years exceptional experience in ferrous and non ferrous metallurgy, including all phases of foundry practice, melting, alloying, heat treatment, testing quality control—of iron, aluminum, magnesium, and copper alloys. Installed and supervised complete metallurgical control laboratories; done trouble shooting and consulting work. Employed in responsible administrative position but desire change. Age 38.

PW132—Metallurgist: Graduate met. engr., 5 years experience in iron foundry, steel mill, forge shop, manufacturing plant, and aircraft gas turbines on quality control, report and specification writing, materials selection and fabrication, heat treatment, physical testing, welding, brazing, and customer contact work. Desire responsible position with progressive organization as foundry metallurgist or in sales engineering and development.

PW133—Metallurgist or Superintendent: 11 years experience in gray iron metallurgy and supervision; molding, melting, pouring, mechanical maintenance. Jobbing and production castings, ½ lb to 8 tons; machine tools, agricultural, automotive, pressure castings. Knows cupola operation, fuel substitution, natural and synthetic sands, facing materials, all types molding equipment. Chemical engineering degree. Available immediately for production or research.

PW134—Industrial Engineer/Consultant: Have thorough knowledge and background in latest foundry practices, improved pattern and core box design, development of present and new equipment for better operations. Will consider any Western inquiries.

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2	Aluminum Foundry Process Control (SAE)	1.00	2.50
39	AFS Foundry Apprentice Course Outline	1.00	2.00

29	AFS Apprentice Training Standards for the Foundry Industry	1.00	2.00
27	AFS "Transactions" Vol. 51 (6x9)	3.00	15.00
30	AFS "Transactions" Vol. 53 (8½x11)	4.00	15.00
31	AFS "Transactions" Vol. 54 (8½x11)	4.00	15.00
32	AFS "Transactions" Vol. 55 (8½x11)	4.00	15.00
33	AFS "Transactions" Vol. 57 (8½x11)	8.00	15.00
3	Analysis of Casting Defects	2.50	4.25
35	Bibliography of Centrifugal Casting	1.50	2.25
4	Cast Metals Handbook (3rd Edition)	4.50	7.50
6	Classification of Foundry Cost Factors	1.00	2.00
7	Cupola Operations Handbook	6.00	10.00
8	Development of the Metal Castings Industry	5.00	8.50
38	Foundry Core Practice	6.50	10.00
9	Foundry Cost Methods	1.50	3.00
10	Foundry Dust Control	1.00	2.00
11	Foundry Process Control (SAE)	1.50	2.50
12	Foundry Sand Testing Handbook (5th Edition)	2.25	4.00
37	Fourth Annual Foundation Lecture	1.00	2.00
13	Gating and Heading Malleable Iron Castings	1.50	2.50
14	Gating Terminology Chart (Discount on quantity lots)	.10	.25
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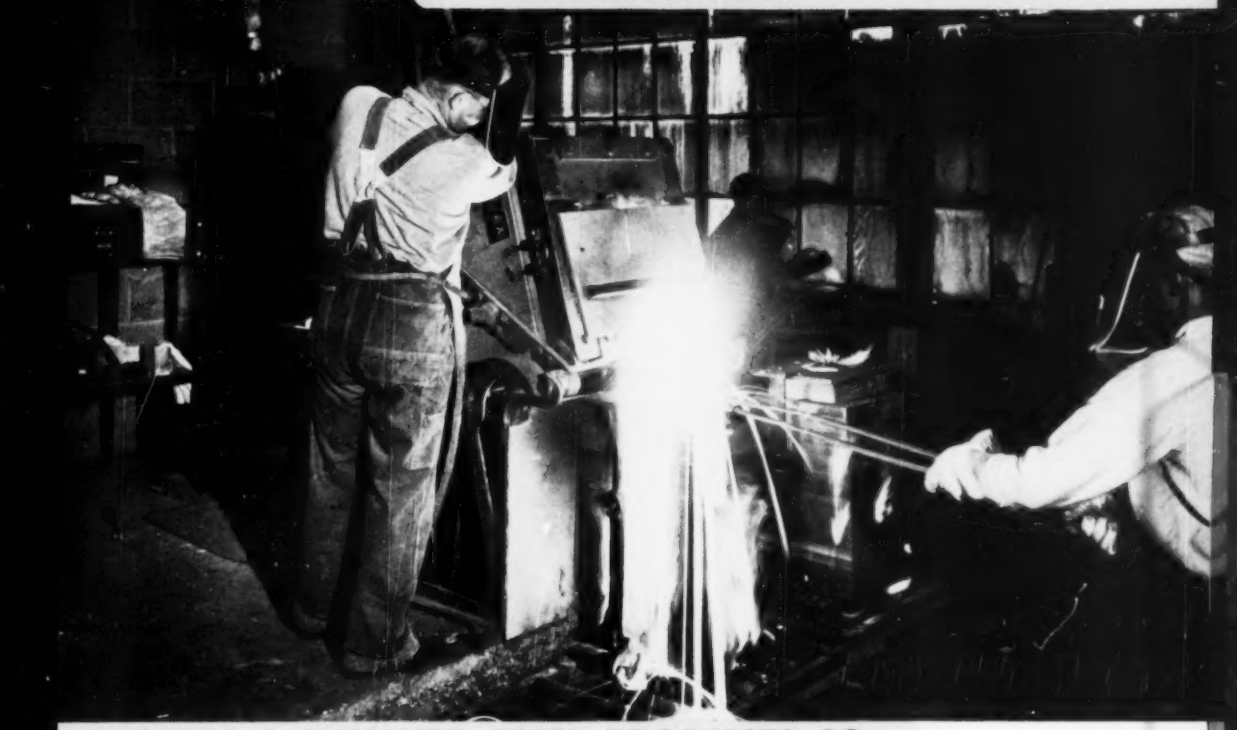

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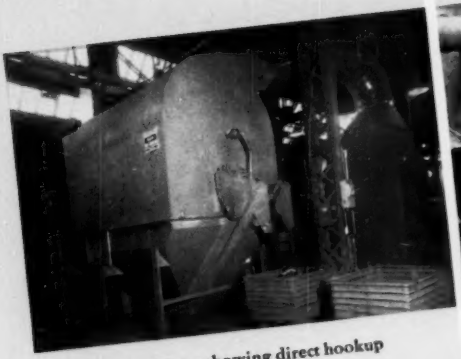
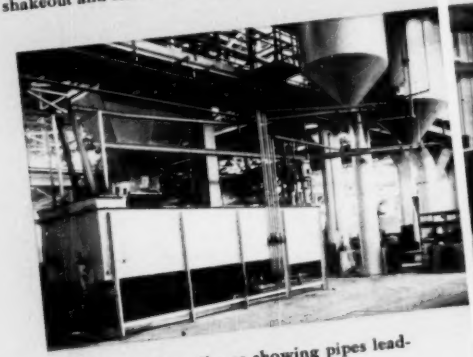


Type "CH" Hydro-Clone showing direct hookup with shakeout and sand-handling system.

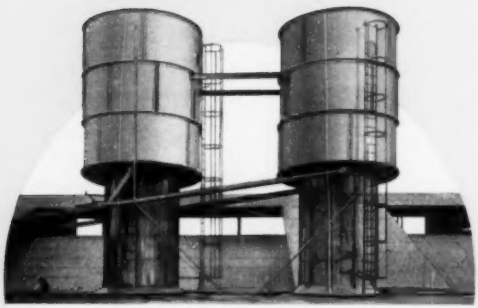
Type "H" Hydro-Clone mounted out-of-doors on a low roof. Bottom pipe leads to sludge disposal system.



Two Type "V" Hydro-Clones showing pipes leading to sludge dewatering tank (lower left).

Dust and gases at shakeout are drawn to side hood for disposal in Hydro-Clone suppressor.

how WHITING HYDRO-CLONES suppress foundry dusts at their source



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